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BROOKLYN BOTANIC GARDEN RECORD

EDITED BY

C. STUART GAGER

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THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL VII January, 1918 No. 1

PROSPECTUS OF COURSES OFFERED BY THE BROOKLYN BOTANIC GARDEN, 1918

A. CHILDREN'S GARDENS AND NATURE STUDY

Courses for Children

A1. Garden Practice.—A course in outdoor work, open only to those pupils who are recommended by their teachers for excellence in nature study in their schools. The work includes the raising of common vegetables, flowers, and fiber plants. Open to a limited number of both boys and girls. A *fee of twenty cents* will be charged, the material raised becoming the property of the pupil. Twelve lessons every *Saturday* morning, 10:30–11:30, from *April 13–June 29.* Miss Shaw, Miss Cross.

A2. Summer Garden Work.—A summer's work in the garden, each child having his own plot. A *fee of twenty cents* a month will be charged for material consumed except to those continuing from Course A1, who will be charged *ten cents.* Each child has the product from his own garden. *Saturday* mornings, 9–11, *July 6–September 28.* Miss Shaw, Miss Cross.

A3. Nature Study.—The structure and germination of seeds; the parts of a plant and their uses; relation of the plant to soil, air, water, and light. The course consists of a study of the plants themselves, with experiments and greenhouse work done by the

children. Open to children from 8–12 years of age. A *fee of fifteen cents* will be charged to cover material used. A certificate will be given those who satisfactorily complete the course. Courses will be given, both spring and fall, as follows:

Boys' Spring Course.—*Saturday* mornings, 9–10, from *February 2–March 23.*

Girls' Spring Course.—*Saturday* mornings, 10–11, from *February 2–March 23.*

Boys' Fall Course.—*Saturday* mornings, 9–10, from *October 12–November 30.*

Girls' Fall Course.—*Saturday* mornings, 10–11, from *October 12–November 30.* Miss Shaw, Miss Cross.

A4. Plant Propagation.—Raising of plants from seeds for the outdoor vegetable and flower garden; elementary study of soils. Work done in the children's greenhouse. *Fee,* for material used, *fifteen cents.* Girls and boys from 12 to 15 years of age are eligible to these courses. Two of the courses will be offered each spring and two each fall, as follows:

Girls' Spring Course.—*Saturdays,* 10–11, *February 2–March 23.*

Boys' Spring Course.—*Saturdays,* 9–10, *February 2–March 23.*

Girls' Fall Course.—*Saturdays,* 10–11, *October 12–November 30.*

Boys' Fall Course.—*Saturdays,* 9–10, *October 12–November 30.* Miss Shaw, Miss Cross.

A5. Advanced Nature Study.—A course designed for those older boys and girls who have taken courses *A1–A4.* Plant collections will be made, and the simpler principles of classification studied. Special problems will be assigned to individuals, and larger garden plots will be set aside for the further working out of these problems. *Open only to pupil assistants of the Garden who are working for their silver pins. Hours to be arranged.*

A6. Junior Gardener's Course.—A course for boys from 14–17 years of age. Lessons given in the care of border and other

flower beds, in the weeding and care of small vegetable gardens, in mowing and watering lawns, repotting plants, etc. This is planned to fit boys for summer work and to enable them to obtain positions. Hours to be arranged. *Fee fifty cents.* Practical work with the gardeners and foreman, under Miss Shaw's supervision. Miss Shaw.

A7. Nature Study for Boy Scouts, Camp Fire Girls and Others.—Short courses of at least four hours each, with talks, demonstrations, and field trips in the Botanic Garden and Prospect Park to study trees, shrubs, etc. The instruction will be adapted to meet the needs of the various groups who apply. *Open only to groups of at least ten persons,* at hours to be arranged. Mr. Stoll.

Courses for Teachers

A8. Greenhouse Work for Teachers.—This course is planned to be of assistance to teachers in garden work with children and to correlate with the class work of our city schools. A study of soils, and of the plant itself. Practical work in the propagation of plants, and the raising of flower and vegetable seedlings for the outdoor garden. A *fee of one dollar* will be charged to cover cost of materials. *Tuesday* afternoons, from 4–5, *February 26–March 26.* Miss Shaw.

A9. Nature Study for Teachers.—Intended to familiarize teachers with material suitable for class use and with easily accessible sources. The work given will be practical, such as may be applied in the Nature Study teaching of the class room. A *fee of fifty cents* will be charged to cover cost of material. *Mondays,* from 4–5. *April 1–May 27.* Miss Cross.

A10. Fall Garden Work.—Home plants; the school window box; indoor planting of bulbs; the outdoor bulb bed. A *fee of one dollar* will be charged to cover cost of materials. Five *Tuesday* afternoons, from 4–5, *October 1–29.* Miss Shaw.

A11. Fall Nature Study Work.—The emphasis in this course will be placed on the common nature material and its use in the

class room. A *fee of fifty cents* will be charged. *Mondays* at 4, from *October 7–November 25.* Miss Cross.

Saturday Afternoon Lectures for Children

(Admission only by Ticket)

Stories About Plants. (Illustrated.)

April 6. Our friends, the common trees.
April 20. How to make a garden.
May 4. Early spring wild flowers.

These talks will be given at three o'clock in the new lecture hall, and will be illustrated by lantern views. Tickets will be issued in the order of application until the number is exhausted. Parents are invited to accompany their children.

The talks will be repeated for school classes, if so desired, either at the Garden or at schools.

B I. Courses for Teachers of Children's Gardening

The course for teachers in children's garden work is planned not only to prepare for garden work, but for the teaching of nature study as well. Our courses are so arranged that they emphasize not only the theory of each subject, but its actual practice, either in classroom, greenhouse, garden, or field. At the same time the work is correlated to meet the needs of each grade of the elementary school. There is an increasing demand for good nature work in our schools, and we make a special point of giving simple, definite, helpful work, grading it so that it applies directly to the immediate needs of our own city schools. Practice is given in all this work with classes of children of different ages. The requirements for entrance to this course are the following: a certificate from a city training or normal school, a college diploma, or several years of successful teaching. These courses may be completed during one year, or as in the case of city school teachers, may extend over a period of two or more years. *The fee for the entire course is twenty dollars,* payable either in full at the time of the registration, or ten dollars at the time of registration and ten dollars six months later. No money will be refunded if the student drops the work, and no monetary allow-

ances for courses taken at other institutions, although time allowances will be made.

Special stress is put upon the outdoor garden practice. This practice is of two kinds: (1) Practice with children. There are three hundred children in our outdoor garden and every opportunity is given for the student to become accustomed to handling children and for working out problems connected with this phase of work. (2) Practice in the teacher's garden. Each student has a garden of her own and works it herself, thus performing all gardening operations to be taught later to her group of children.

To those who satisfactorily complete this course a certificate will be given. *The courses given in children's gardening are considered as a unit, and are not given separately.*

B1. Soils and Agricultural Principles.—A study of soils; fertilizers, natural and chemical; relation of water and air to soil; liming; mixing of soils and tillage. Four lectures with laboratory work. *Tuesday* afternoons, from 4–5, *February 5–26.*

Miss Shaw.

B2. Elementary Botany.—A survey of general physiological and morphological principles, illustrated by a few of the more important types of plants. Sixteen lectures and demonstrations in laboratory, greenhouse and garden. *Mondays* at 4 p. m., *February 4–May 20.* Dr. Olive, Dr. Gundersen.

B3. Children's Garden Practice.—The theory and practice of garden work; including such topics as planning and making the garden, laying out of grounds, preparation of soil, seed sowing, transplanting, cropping, cultivation, school garden management, improvement of school grounds, preparation of exhibits. Twenty lectures and outdoor practice work with children in their own garden. *Saturday* mornings, 10–11:30, *February 9–June 22.*

Miss Shaw, Miss Cross.

B4. Plant Propagation and Greenhouse Work.—Methods of plant propagation, care of plants, cuttings, raising of seedlings for the outdoor garden. Work related to children's gardens. Laboratory work. Six *Wednesdays,* 3:30–5 p. m., *February 27–April 3.* Miss Shaw, Miss Cross.

B5. Nature Study.—Nature in relation to gardens and plant life. Topics: plant structure; fruit and fruit formation; weeds; weed dispersal; insect pests; birds in their relation to agriculture; garden friends; shrubs; shade and lawn trees. Twenty lectures, with field work. *Tuesdays,* 4–5 p. m., *March 5–May 21* and *September 24–November 12.* Miss Cross.

B6. Fungous and Insect Pests.—Four lectures and demonstrations on the occurrence of, and methods of combating the commoner fungous and insect pests of garden and greenhouse plants. *Mondays* at 4 p. m., *May 27–June 17.* Dr. Olive, Mr. Free.

B7. Fall Garden Work.—Practical work with the outdoor bulb bed, harvesting of garden crops, indoor planting of bulbs, raising of plants indoors, the window box. Five lessons on *Wednesday* afternoons, from 4–5, *October 2–30.* Miss Shaw.

B8. Pedagogy of Botany.—A brief discussion of the mental processes involved in learning and teaching science, and the fundamental principles which underlie and point the way to laboratory and field work. Three successive *Wednesday* afternoons, from 4–5, *November 6–20.* Dr. Gager.

B9. Genetics.—Four lectures on the problems of heredity, variation and environment, and their bearing on education; illustrated by demonstration material obtained from plant-breeding experiments, and by lantern slides. Lecture subjects: Kinds and extent of variation in plants and animals; How characters are inherited; Sex in plants and the methods of crossing; Human heredity. *Tuesdays,* from 4–5, *November 19–December 10.* Dr. White.

B10. Woodwork.—The construction of simple garden apparatus, such as window boxes, flats, sieves, tampers, dibbers, etc. *Saturdays,* 10–12, *March 2–30* or *September 28–October 26.* Mr. Stoll.

B11. Practical Garden Work.—A summer's work with children in the Botanic Garden under supervision.

B II. Summer School of Children's Gardening

Courses *B1–B11* are also offered as a concentrated five weeks' summer course, from *July 9* to *August 13, 1918*. For circular and further information apply to Miss Ellen Eddy Shaw.

C. Courses for the General Public

C1. House Plants and Small Conservatories.—Five lectures with demonstrations and practical work. The course includes consideration of principles to be observed in the care of indoor plants, and cultural details concerning suitable subjects. Instruction will be given with reference to hanging baskets, window boxes, Wardian cases, etc. A *fee of $2.50* will be charged to cover cost of materials used. The plants raised by the class will become the property of those taking the course. *Thursdays* at 4, *January 17–February 14.* Mr. Free.

C2. Garden Planning.—The object of this course is to help owners of small places to plan their yards and gardens to best advantage. *Thursdays* at 4, *February 21–March 7.* Mr. Free

C3. The Outdoor Flower Garden.—Ten lectures with demonstrations and practical work. Instruction will be given with regard to soils, preparation of grounds for planting, propagation, hardy perennials, annuals, vines, herbaceous borders, summer bedding, shrubbery, roses, making and care of lawns, drainage, etc. A *fee of $1.00* will be charged to cover cost of materials used. *Thursdays* at 4, *March 14–May 16.* Mr. Free.

C4. Garden and Greenhouse Work in Fall.—A course of six lessons covering the making of cuttings, taking up and storing of plants, bulb planting, winter protection of plants, fall pruning, etc. *Thursday afternoons* from 4–5, *September 26–October 31.* A *fee of $1.00* will be charged to cover cost of material used. Mr. Free.

C5. Spring Flowers and Ferns.—Largely an outdoor course, with some excursions. *Fee $1.00.* Twelve *Saturdays*, at 10, from *April 6–June 22.* Dr. Gundersen.

C6. Fall Course in Trees and Shrubs.—Most of the time will be given to outdoor study in the Botanic Garden and adjacent Prospect Park. *Fee $1.00.* Ten *Saturdays*, at 10, from *September 21–November 23.* Dr. Gundersen.

C7. History of Botany.—Four illustrated lectures giving a brief outline of the history of botany from the time of the Greeks to the present. *Wednesdays,* at 4 o'clock, *February 6–27.* Dr. Gundersen.

C8. Bacteria and Other Micro-organisms in the Home.—Eight periods devoted to lectures and demonstrations on the occurrence of bacteria, yeasts, molds and other micro-organisms in the home; in water, sewage, etc. *Saturdays,* at 11:00, *February 2–March 23.* Dr. Olive.

C10. Classes in Gardening.—Special classes in vegetable gardening may be arranged for by clubs or groups of at least 12 members. For particulars address Miss Ellen Eddy Shaw.

C11. Evening Course in Vegetable Growing, with special reference to "War Gardens." Three lectures, illustrated with lantern slides and demonstrations. Preparation of the ground, hotbeds, and cold frames; tools and implements; cropping plans, seed sowing, transplanting, cultivating; insect and fungous pests, methods of protecting plants by sprays and other devices; harvesting and storing; the important vegetables and their varieties. An *evening* course on *Wednesdays* from 8–9 p. m., *March 6, 13, 20.* Mr. Free.

N. B. These courses are free to members of the Botanic Garden and to the public unless otherwise specified. Those planning to take any of the above work are asked to register at the Garden at least one week before the course opens, so that adequate arrangements may be made for materials, etc. They are open to both men and women, *but no course will be given to a class of less than six.*

D. Advanced Courses and Investigation

For the following advanced and research courses there is a charge covering all expenses, including laboratory fee, of *$30 for each full course* of 100 credit hours, and *$20 for each half course* of 50 credit hours.

Advanced Courses

D1. Mycology and Plant Pathology.—Morphology and pathology of the fungi and bacteria. Life histories of fungi; methods of control of plant diseases, etc. Prerequisite, a satisfactory college course in general botany. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D2. Fresh-water Microbiology.—A course of lectures, recitations, and laboratory work on the various organisms found in drinking water. Odors, colors, etc., of drinking water; methods of microscopical and bacteriological examination. 50 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D3. Cytology.—A course of lectures and laboratory work on cell structure and physiology. Methods of cytological technique, and practice in accurate interpretation of cell phenomena. Prerequisite, satisfactory college courses in general botany and plant physiology. 100 credit hours of work. Hours to be arranged. Dr. Olive and assistant.

D4. Experimental Evolution.—Detailed studies of the nature and causes of variation and heredity. Some of the subjects considered are: Historical Resumé of the Evolution Theory, Physical Basis of Inheritance, Inheritance of Acquired Characters, Kinds and Causes of Variation, Mendelism, Biometry, Principles and Technique of Plant Breeding. This course is open to students of college rank with a knowledge of the elements of physics, chemistry, geology, botany, and zoology. The work is primarily intended for students in pure science, and for agricultural or horticultural students fitting themselves for various professional activities in these particular fields. Three lectures and two laboratory periods a week. 100 credit hours of work. Hours to be arranged. Dr. White.

D5. Phytogeography.—A course dealing with plant distribution over the earth. Prerequisites are courses in plant ecology and geology, and a good general knowledge of climatology and systematic botany. 50 credit hours of work. Hours to be arranged.
Mr. Taylor.

D6. Seminar and Journal Club.—Irregular meetings of the Garden Staff and advanced students, for the discussion of fundamental problems of botany or of general biology, and for the review of current botanical literature. Open to others on invitation.

*Graduate Study and Botanical Research**

D7. Research in Plant Physiology.—Independent investigation of problems dealing with plant functions. Dr. Gager.

D8. Research in Mycology and Plant Pathology.—Independent investigation of problems in fungi and fungous diseases of plants.
Dr. Olive.

D9. Research in Plant Genetics.—Independent investigation of problems of variation and heredity, including that phase of cytology having a direct bearing on the subject matter of genetics.
Dr. White.

Cooperation With Local Schools

1. Talks at Schools.—The principals of public or private schools may arrange to have lantern talks given at the schools on various topics related to nature study, such as garden work with children, tree planting, and Arbor Day. If an illustrated lecture is desired, the lantern and operator must be provided by the school, but slides will be furnished by the Botanic Garden. Address the Curator of Elementary Instruction for list of talks and for appointments.

* Courses of graduate rank offered by the Botanic Garden, when approved by the Faculty of the Graduate School of New York University, are listed as courses in the Graduate School, and are given the same credit as other graduate courses. Properly qualified students who take these courses may present them in satisfaction of the requirements for advanced degrees given by the University. Graduate credit has also been allowed elsewhere for such advanced work done at the Garden.

2. **School Classes at the Garden.**—(*a*) Schools not provided with a stereopticon may arrange for classes, accompanied by their teachers, to come to the Botanic Garden, for lectures either by a teacher, or by a member of the Garden staff.

(*b*) Notice of such a visit should be sent at least *one week* previous to the date on which a talk is desired. These talks will be illustrated by lantern slides, and by the conservatory collection of useful plants from the tropics and subtropics. Spring and fall announcements of topics will be issued during 1918.

(*c*) The Garden equipment, including greenhouse, plant material, lecture room, lantern, and slides, is at the disposal of teachers who desire to instruct their own classes at the Garden. Arrangements must be made in advance with the Curator of Elementary Instruction, so that such work will not conflict with regular classes and lectures.

(*d*) The principal of any secondary or high school in Brooklyn may arrange also for a series of six lessons on plant culture to be given during the fall to a class. These lessons will be worked out for the most part in the greenhouse. Such a course must be arranged for in advance, and the class must be accompanied by its teacher. Adapted for pupils above the fourth grade.

3. **Home Gardening.**—Assistance will be given to children in planning and planting home gardens. Enrollment cards for such assistance may be had on application to the Curator of Elementary Instruction. Prizes will be offered to both schools and individuals, at the annual Children's Garden Exhibit, for the best results in home gardening. This exhibit is open to all children in the City of Brooklyn, although their garden products may have been raised at their summer homes. *Certifications must be made that the work has been done by the child himself.*

The exhibit for 1918 will be held on the 20th and 21st of September. All exhibits, of schools as well as of individuals, must be brought to the Brooklyn Botanic Garden on the afternoon of September the 19th, or by 10 o'clock on the morning of the 20th. The exhibit will be judged on the afternoon of the 20th, and will then be on exhibition for the public from three to five o'clock on the afternoon of the 20th, and from ten in the morning

until four in the afternoon of the 21st. The announcement of prizes will be made on the 20th. After four o'clock on the 21st, exhibitors may remove their exhibits. Prizes will be distributed on Saturday afternoon, October 5, at three o'clock.

Silver and bronze medals will be awarded as first and second prizes for individual exhibits. A trophy is the first prize for the school making the best exhibit as a whole. A bronze statue is another trophy for the best school roof garden. Each trophy is to be competed for annually until one school wins it three times, when it will become the property of that school. A new prize will then be offered.

4. Penny Packets of Seeds.—In order to assist the above work, penny packets of seeds are put up by the Botanic Garden, for children's use. In the early spring, lists of these seeds, conditions for entry as an exhibitor, home gardening record cards, and other information may be had on application to the Curator of Elementary Instruction.

5. Conferences.—Conferences may be arranged by teachers and principals for the discussion of problems in connection with gardening and nature-study. Monday and Saturday afternoons are usually available for this purpose. Appointments must be made in advance. Address Miss Ellen Eddy Shaw.

6. Study and Loan Material.—On request, the Garden will endeavor to provide living seedlings or plant parts for study, to the extent of our facilities. Teachers may arrange to have various physiological experiments or demonstrations conducted at the Garden. Petri dishes, which must be cleaned and delivered to the Garden, will, on request, be filled with nutrient agar, ready for exposure in the study of bacteria and molds. In all cases arrangements must be made by teachers for calling for such material, and all material loaned by the Garden must be returned promptly in good condition.

Plantations

The plantations comprise several sections, including the local flora (native wild flower garden), general systematic (trees,

shrubs and herbaceous plants not native within 100 miles of Brooklyn), morphological, ecological, economic, and rock gardens, Japanese garden, and children's gardens. As noted below, under *Docentry,* arrangements may be made for viewing the plantations under guidance. They are open to the public free to the public daily from 8 a. m. until dark; on Sundays and holidays at 10 a. m.

Conservatories

The Garden conservatories contain a collection of tender and tropical plants. Of special interest for teachers of nature study and geography is the economic house, containing useful plants from the tropics and subtropics, including the following: banana, orange, lemon, lime, citron, kumquat, tangelo (a cross between the grape-fruit—pomelo—and the tangerine), West Indian cedar (the source of the wood used for cigar boxes), eucalyptus, Manila hemp, sisal, pandanus (source of the fiber used for making certain kinds of fiber hats), fig, grape vines from north and south Africa, date palm, cocoanut palm, chocolate tree, coffee, tea, camphor, ginger, sugar cane, avocado (so-called "alligator pear"), Para and other rubber plants, banyan, religious fig of India, and numerous others.

The conservatories are open daily from 10 a. m. to 4 p. m. In this connection see also below, under *Docentry.*

Herbarium

The Garden herbarium consists at present of over 100,000 specimens, including phanerogams, ferns, mosses, liverworts, lichens, parasitic and other fungi, algæ, and myxomycetes. This collection may be consulted from 9 a. m. until 5 p. m. by those interested, and specimens submitted will be gladly identified. Address, Curator of Plants.

Library

The rapidly growing library of the Garden, comprises at present about 4,000 volumes and 6,000 pamphlets. This is not a circulating library, but is open free for consultation to all persons, from 9 a. m. until 5 p. m. Over 200 current periodicals devoted to botany and related subjects are regularly received.

Docentry

Classes, and other parties of several persons, wishing to view the conservatories and plantations uuder guidance, may arrange with the Curator of Public Instruction for appointments with a docent to conduct them through the Garden. For this service there is a charge of 25 cents an hour or fraction thereof, or 10 cents a person for parties of three or more; except that *no charge is made for teachers with classes, nor to members of the Botanic Garden.*

PHYTOPATHOLOGICAL SURVEY OF THE TREES AND SHRUBS OF PROSPECT PARK AND THE BOTANIC GARDEN (BROOKLYN). II. REPORT OF THE SECOND SEASON'S WORK

Dr. C. Stuart Gager, Director.

Sir: I beg leave to submit herewith my report as Resident Investigator at the Brooklyn Botanic Garden for the season of 1917. The report deals with a continuation of the studies on the diseases of trees and shrubs in the Brooklyn Botanic Garden and Prospect Park, Brooklyn. These studies were begun in the summer of 1916.

Fortunately it was possible to begin the work the present season on the first of April and continue it until the twelfth of September. The longer period made possible much more extended studies of the condition of the woody plants in the Park and the Garden. The spring months were particularly favorable for making careful observations of the trees for the presence of wood-destroying organisms. It was comparatively easy to note the occurrence of decayed areas before the trees had come out into leaf. It was also possible to secure additional collections of fungi, as some forms develop their fruiting stages in the spring months. It is to be regretted that the time could not be extended in the fall, for that is the season for the appearance of the reproductive structures of many fungi.

I wish again to acknowledge the interest of Hon. Raymond V. Ingersoll, commissioner of parks, Borough of Brooklyn, in this work, who generously placed men and equipment at my disposal and thus made possible the collection of specimens for study. I am also greatly indebted to Doctor J. J. Davis, curator of the herbarium at the University of Wisconsin, for valuable assistance in the identification of many of the fungi collected during the progress of the survey.

During the first part of the present season a detailed study of the condition of the trees in the southern section of the Park was made. The area covered included the section of the Park between the lake and the fence, extending from Gate 3, Lincoln Road Entrance, around to Gate 6, Coney Island Avenue Entrance, together with a narrow strip north of the lake extending from Gate 6 to Gate 3. In addition, the condition of the trees on the streets bounding the Park was included, the streets being Ocean Avenue from Lincoln Road to Parkside Avenue, all of Parkside Avenue adjacent to the Park, and Coney Island Avenue from Parkside Avenue to Gate 6.

A careful examination of each tree more than six inches in diameter in the section of the Park above referred to was made with reference to the occurrence of decayed areas on the main trunk and the larger limbs. A study of the extent of such areas, the depth to which the decay had extended and the relation of these areas to previous pruning operations, was carried out. The smaller and younger trees were not included in this survey for, in general, they were in good growing condition and free from the presence of decay-producing organisms. These trees were not included in the totals.

The area intensively surveyed contained approximately 1,830 trees, representing about fifty different kinds. In several cases only a very few trees of a kind were found in the area. In other cases, for example, the elms, lindens, maples, sycamores and others, the number of trees was quite large.

Decayed places were found on many of the trees included within this section of the Park. These decays were classified as major or minor, depending upon whether the places were extensive, more or less deep seated and found on the main trunk,

or whether the decayed areas were small, superficial and found on the larger limbs. The major decayed places were much more serious and impaired the value of the tree.

An examination of the trees showed that 231 had decayed areas classified as major, and 192 had decayed areas classified as minor. It is thus seen that 423 trees out of a total of 1,830, or about 23 per cent., were found to be injured by decay-producing fungi. Differences were noted among the various kinds of trees with reference to the occurrence of decay. Certain kinds of trees, as the silver maple, the Norway maple, the ashes, and the birches, showed a very high percentage of decayed areas. In these cases 25 to 50 per cent. of the trees were more or less injured by decay-producing organisms. Many of the different varieties of trees, however, showed much lower percentages of injury.

In very few cases were collections made of the fruiting bodies of the fungi responsible for the decay. This was due, in part at least, to the fact that these structures are rather conspicuous and thus attract the attention of individuals who remove them from the trees. Further, the pruning operations carried out by the Park workmen tend to the removal of these fungous structures. It is also known that wood-destroying fungi may be present for many years without producing their fruiting stages. The mycelium, however, continues to develop and to cause extensive decay of the wood.

In several cases, however, the fruiting structures of various polypores were secured. Several specimens of *Polyporus betulinus* (Bull.) Fr. were obtained from the gray birch. The trees were severely injured by the growth of this fungus, the larger limbs being almost completely destroyed through its action.

A well-developed specimen of *Daedalea quercina* (L.) Pers. was found on the English oak. The fruiting body was located at a point on one of the large limbs where, previously, a smaller limb had been pruned off. The fungus had doubtless gained entrance at the pruned surface and, by subsequent growth, had produced decay back for a considerable distance. In fact, the decayed region extended back almost to the main trunk of the tree.

A specimen of *Fomes applanatus* (Pers.) Wallr. was collected on the honey locust. It was found near the base of the tree,

where a large limb had been broken off some time previously. The broken branch had been pruned off and the surface covered with some tar preparation. Nevertheless, decay occurred at the edge of the wound and the fungus formed a fruiting body. A few other specimens of this same fungus were collected at the base of some large privet shrubs. These plants had been pruned back, leaving a large number of stubs a foot or more in length. From these stubs the new leaf-bearing branches of the shrub had developed. The fruiting bodies of the fungus were collected close to the ground, attached to the large stubs, which, however, still produced leafy branches.

Several typical specimens of *Polyporus gilvus* Fr. were collected on the silver maple, blue beech (American hornbeam) and cherry. The fruiting bodies of this fungus were taken from the main trunk of a silver maple in 1916. These covered a considerable area of the trunk and were associated with an extensive decay of the wood. Following the removal of these brackets in 1916 the Park workmen cut away the decayed wood and applied a tar preparation. In 1917, however, additional fruiting bodies were observed growing from the same part of the tree. The fruiting bodies of the same fungus were abundant on the main trunk of a cherry, associated with extensive injuries. On the American hornbeam the main stem was attacked and bore several brackets of the fungus.

The large lilac and privet shrubs were more or less severely attacked by *Polystictus versicolor* (L.) Fr. Most of the larger shrubs of these plants had been cut back, leaving short stubs six inches to two feet in length, and from these the new leafy branches had arisen. It was discovered that, in a large percentage of cases, these old stubs were severely attacked by the fungus. The wood of these stubs was more or less completely disintegrated and the fruiting bodies of the fungus were generally present. Sometimes a part of the wood in the stems was decayed and bore numerous brackets, while the other side was still sound and produced long leafy branches. The common occurrence of this fungus on the older lilac and privet shrubs indicates that it is a serious enemy and special precautions should be taken to prevent its spread on these plants. Since the fungus is

generally found on the old pruned branches, it is necessary to exercise unusual care in pruning and treating the cut surfaces.

This same fungus was obtained from other plants. In 1916 it was found on an English haw. This particular tree had branched close to the ground and consisted of two main stems each about five inches in diameter at the base and about twelve to fifteen feet high. One of these branches was entirely dead, the wood was badly decayed and the surface was well covered with the brackets of the fungus, the latter extending from the ground to practically the tip of the branch. The Park workmen removed this branch but in 1917 new fruiting bodies of *Polystictus versicolor* developed at the base of the other branch.

Very typical specimens of *Polystictus hirsutulus* Schw. were collected on an English oak. These were located on one of the larger branches and were associated with extensive decay of the wood.

The fruiting structures of other higher fungi were collected. An unidentified polypore was taken from several large wild cherry trees. *Schizophyllum alneum* Schr. was collected on dead branches of *Ailanthus* in the Botanic Garden and on sumac in the Park. *Pleurotus ostreatus* Jacq. was collected on the sugar maple. A species of *Stereum* was secured from the English oak and the black birch.

In connection with the more intensive survey of the condition of the trees in a limited section of the Park, it was observed that a large number of the decayed areas were associated with previous pruning operations. Extensive decayed places were found on 225 trees where limbs had been removed. Of these 157 were classed as major decays and 68 as minor. It has also been noted above that the fruiting structures of the decay-producing organisms were frequently found adjacent to pruned surfaces. Obviously, since wood-destroying fungi are essentially wound-parasites, it is particularly important to prevent their entrance at the places where limbs are removed.

As noted in the previous report the most serious disease encountered was one affecting the gray and white birches in both the Park and the Botanic Garden. The trouble was much more apparent in the Garden on account of the large number of the

gray birches growing there. It is quite clear that the primary cause of the death of these trees is the bronze birch borer, an insect that has proved very destructive to birch trees in various localities, especially in parks. All of the dead and dying trees in the Garden were badly infested with this insect. It appears that no remedy for this borer has been found that does not involve the destruction of the tree. It is likely that little can be done to save the remainder of these trees, although the complete removal of all infested trees in the late winter may be effective in destroying the borers and so protecting the uninfested trees.

Associated with the bronze birch borer, however, were various fungi. *Cytospora horrida* Sacc. was found to occur with great regularity on the small branches of the trees whose main branches had been killed by the borer. This fungus fruited abundantly on branches up to one half inch in diameter or slightly larger. Another fungus of very common occurrence was *Melanconium bicolor* Nees. The fruiting bodies of this fungus developed quite extensively on large branches and even on the main trunk of the tree. It was not unusual to find the spore pustules being produced on the canker-like areas produced on the limbs by the borer.

The leafspot of the sycamore, *Gnomonia veneta* (Sacc. & Speg.) Kleb., was again common in both the Park and the Botanic Garden. This disease, however, was not nearly so severe this year as last. There was considerably less defoliation of the trees in late June and early July during the present season. Still the disease was conspicuous on the trees.

The catalpa leaf spot, *Phyllosticta catalpae* Ell. & Mart., was as common as during the preceding season. Most of the trees in the Park were extensively defoliated during July. Most of the leaves on these trees had numerous infected spots, which, in some cases, included more than half the leaf area.

The leaf spot of the tulip tree, *Phyllosticta liriodendri* Thuem., was also prevalent. It appears that this fungus is associated with leaf areas killed by the development of the larva of an insect. These dead leaf spots were quite abundant, but the fruiting bodies of the fungus did not occur frequently.

The shot hole fungus, *Cercospora circumscissa* Sacc., was very common on small trees of the Japanese cherry and peach which

were growing in the Garden. While most of the leaves were infected, no extensive defoliation occurred.

The recently reported disease of the poplars, caused by *Dothichiza populea* Sacc. & Bri. was collected in both the Park and the Botanic Garden. Only the smaller branches seemed to be infected. It is probable that this disease will prove serious as it has elsewhere.

The few red cedars in the Park were severely attacked by the rust, *Gymnosporangium clavipes* Cke. & Pk. Practically all of the larger limbs, as well as many of the smaller ones, had one or more of the characteristic swellings due to the fungus. In May the diseased areas were quite conspicuous on account of the brightly colored, swollen, gelatinous masses of teleutospores. This was the only species of *Gymnosporangium* found in the Park.

As noted during the previous season the rhododendrons of the Park were infected by a fungous disease. The tips and the margins of the leaves turned brown and the leaves fell from the bushes prematurely. A large proportion of the plants were infected and were more or less defoliated. The disease, however, was mainly confined to the leaves of the preceding year, the new leaves of the current season being free from the trouble. The fungus has been identified as *Laestadia rhodorae* (Ck.) Berl. & Vogl. The immature ascocarps were very abundantly developed on the diseased leaves, but few asci with mature ascospores were obtained.

The roses in the rose garden of the Park were again infected with the common rose leaf spot, caused by *Actinonema Rosae* (Lib.) Fr. Some varieties were severely attacked, resulting in a partial loss of the leaves. The rose powdery mildew was also present, particularly on the rambler types of roses in the Park and Garden.

Only a few powdery mildews were noted. The lilac mildew, *Microsphaera alni* (Wallr.) Salm., was very common in the late summer and early fall. The conidial stage of a powdery mildew was observed on some young oak sprouts in the Park. Similar diseases were very common on the herbaceous perennials in the Garden, various composites as the asters, goldenrods, sunflowers, and others, being especially attacked.

The sunflower rust, *Puccinia helianthi* Schw., was quite prevalent on the annual sunflowers in the Garden. The hollyhock rust, *Puccinia malvacearum* Mont., was common in the Park.

A number of foliage injuries of several varieties of trees were observed which were not associated with any fungus. The leaves of both the European and American beeches were characterized by the occurrence of conspicuous yellow or brown areas between the veins. This appearance was probably due to sun scorch. Sun scorch seems to be due to excessive transpiration brought about by the prevalence of warm, dry winds, especially in the early summer, when the roots cannot furnish an adequate supply of water. Closely related to this was the burning of leaves, which occurred in a striking manner in the sugar maple. On some trees most of the leaves had a bronzed appearance, the margins of the leaves especially being dead and of a reddish brown color. Similar appearances were noted on a number of other trees and shrubs, such as the sycamore maple, the varnish tree, the ash, and the barberry.

Slime-flux was particularly prevalent on the elm. On a large proportion of these trees there was a marked exudation of a slimy, discolored sap from conspicuous cracks on the main trunks. The exudation occurred from cracks or crevices near the top of the main trunk where the large limbs branched off. In addition to giving the trees an unsightly appearance, slime-flux may cause permanent injury to the bark and the underlying tissues.

The trees and shrubs of a city park cannot be looked upon as entirely isolated from those of the surrounding region. Diseases on the latter may prove a serious menace to the plants in the park. It is essential then to have information as to the occurrence of serious diseases in the adjacent areas. In order to obtain some preliminary information on this question, occasional collecting trips were taken to several places on Long Island and other points adjacent to New York City. In the time available no complete survey was possible. Various parasitic fungi were collected on these trips, but special attention was paid to the forms on woody plants. A large number of fungi were secured from a variety of hosts, many of which were not found in the Park or the Garden. Among those collected were species of *Cercospora,*

Glocosporium, Marssonina, Phyllosticta, Rhytisma, Septoria, Taphrina, etc. Although *Phyllosticta labruscae* Thuem. on the ivy, *P. minima* (B. & C.) E. & E. on the red maple, *P. phomiformis* Sacc. on the oak, *Rhytisma acerinum* (Pers.) Fr. on the maple, *Gloeosporium betularum* E. & M. on the birch, *G. canadense* E. & E. on the oak, and other fungi that might be mentioned, were very common in different localities, none were observed in the Park or the Garden. This may be due in part to the relative absence of young hosts and to the generally unfavorable environmental conditions. The air of the park certainly contains less moisture than the dense woods along streams. Further the air of cities is known to contain various noxious gases from chimneys, manufacturing plants, and other sources.

The conditions found in the Park and Garden are not exceptional. Similar conditions are doubtless to be found in any large city park. The problem of combatting the various diseases is a very difficult one, involving the use of all available means. The trees of a park are always in danger of infection from diseases in the adjacent region, and constant care must be exercised to guard against them.

One of the most interesting fungi collected was the rust of *Sempervivum, Endophyllum sempervivi* (Alb. & Schw.) de Bary. This rust was found on some *Sempervivum* plants in the Garden. Since this common European rust had not been previously reported for this country, an attempt was made to determine the source and time of its introduction. The nursery from which the Garden secured the *Sempervivum* plants a year earlier was visited, and a number of additional specimens of the rust were secured. It appears that the nursery had imported *Sempervivum* plants from Holland about twelve or fifteen years ago; since that time the disease has been more or less prevalent in the nursery.

The work of identifying the various fungi has not as yet been completed. More than five hundred collections were made in the Park, Botanic Garden, and Long Island or other points adjacent to New York. Many of these are duplicates, but approximately two hundred and fifty different species of fungi were se-

cured. These were mostly from the woody plants, and included only wood-destroying and parasitic forms.

Respectfully submitted,

(Signed) GEORGE M. REED,
Resident Investigator.

THE AMES BEQUEST

By the will of the late Frank H. Ames, the Garden has come into possession of his excellent fungus herbarium, consisting of about 517 specimens, mainly of woody fungi, forty-two books and eighteen pamphlets on mycological and other botanical subjects, and his correspondence with American mycologists, including Peck, Lloyd, Kellerman, Atkinson, and others. This bequest is the second in the Garden's brief history, and forms a valuable and most welcome addition to our collections and library.

Mr. Ames was born at DeRuyter, N. Y., October 8, 1852. For a number of years he taught in district schools, and after graduating from the State Normal School at Geneseo, N. Y., in 1888, he was principal of schools in Mumford, Livonia, Stillwater, and Tottenville. For twenty-four years (1893–1917) he was a teacher in P. S. 14, Manhattan. His death occurred in Cambridge, Mass., on August 1, 1917. Interment was at De Ruyter, N. Y.

Mr. Ames was a zealous collector of fungi, chiefly of the fleshy and woody groups, and made frequent and valued contributions of specimens to the fungus herbarium of the Garden. The following quotations from letters from Mr. Lloyd to Mr. Ames indicate the high esteem in which his work was held, and also the scientific value of the collections bequeathed to the Garden:

"As I always count on getting nice specimens from you, I was anxious to see what you had sent, and stopped my work on the foreign plants and opened one of your boxes."

"I always like to work with your specimens, for you are such a discriminating and good collector that hardly a specimen comes to me from you that is not of interest."

Mr. Ames's name is perpetuated in the species *Polyporus*

Amesii, and *Sebacina Amesii,* named by Lloyd in honor of the collector.

Among the rare or interesting specimens may be mentioned the following. The comments are quoted from Lloyd's letters to Ames:

Hydnum friabile (No. 484). A note by Lloyd says: "*Hydnum friabile* was one of the few plants sent by Fries to Curtis. He published it in *Novae Sym.,* 1851, and the specimen is still at Upsala. I believe this specimen from Mr. Ames is the first collection since."

Polyporus subradicatus Murrill (No. 393). Of this Lloyd remarks: "A very rare plant, and this is the first one I have gotten."

Polyporus subradicatus Murrill (No. 405). Of this specimen Lloyd remarked: "The 'crust' on top is an anomaly when the specimen develops secondary pores, on the same principle that one sometimes notes Agarics with abortive gills *on top.*"

Thelephora mollissima (No. 338). "A very rare plant both in this country and Europe . . . does not appear in Burt's recent paper . . . specimens are in Persoon's herbarium and a better one from Persoon in Montagne's herbarium. I found it in the University park at Upsala and it is *Thelephora intybacea* in sense of Fries (not Burt). It agrees with Fries's description and habitat. It is *Thelephora atrocitrina* for Quelet, who took *Thelephora intybacea* in sense of a *Stereum.* While according to 'Law' we must call this plant *Thelephora intybacea* in sense of Fries, as Fries had it wrong, and as *Thelephora intybacea* in sense of Fries, Quelet, and Burt are each a different plant, I do not see much sense in making such laws."

Polystictus variiformis Peck (Nos. 272, 331). "This is a rare plant, and you are the only correspondent from whom I receive it in the East. It is surely the same plant that Murrill calls *Polystictus hexagoniformis,* under which name I have a fine collection from James R. Weir, Idaho. No. 273 is a pileate specimen."

C. S. G.

NOTES

Dr. Edwin Brigham Copeland, since 1909 dean of the College of Agriculture, University of the Philippines, Los Baños, P. I., spent a day at the Garden on December 19, consulting the ferns in our herbarium. Dr. Copeland has resigned from his position in the Philippines, and will resume residence in this country.

Doctors Gundersen, Olive, White, and Gager, of the Garden staff, attended the Convocation Week scientific meetings in Pittsburgh, December 28, 1917–January 2, 1918. Dr. White attended the sessions of the American Naturalists, devoted to genetics; Dr. Olive the American Phytopathological Society; and Dr. Gunderson the Botanical Society of America. Dr. Gager gave the vice-presidential address before Section G (Botany) of the American Association for the Advancement of Science, on "The Near Future of Botany in America." The meetings were permeated with discussions and suggestions as to how botany, already preeminently a useful science (a fact not generally understood) may be made still more useful, especially in connection with the present international crisis. A number of activities were initiated with this end in view.

At the first fall meeting of the Boys Club and the Girls Club, October 13, 1917, a gift of twenty-five dollars was presented to the Botanic Garden for the purchase of a flag for the Children's Gardens. The presentation was made by Harold Uhrbrock.

Dr. Carl Skottsberg, assistant professor of botany, University of Upsala, and recently appointed director of the botanic garden, newly established at Göteborg, Sweden, visited the Garden on October 20. Professor Skottsberg was en route home from a several months study of the plant geography of Easter Island, about 2,000 miles west of the coast of Chile, and the Juan Fernandez Islands, 350–450 miles from the coast. He sailed for Sweden with Mrs. Skottsberg on November 20.

In connection with the celebration of the turning on of the Catskill water, October 12–13, 1917, the Garden issued a special double number of the *Leaflets* (Series V, nos. 12 and 13) containing two articles; "Forest Problems of the Ashokan Water-

shed" and "Plants of the Catskill Aqueduct Region." Extra copies of this *Leaflet* have been asked for by the Department of Water Supply of the City, and by landscape architects. Fifty copies were requested by one of the high schools of Brooklyn to be used as a basis for class compositions in the English department.

Dr. George K. K. Link, professor of plant physiology, University of Nebraska, who is on leave of absence to assist in the war work of the Bureau of Plant Industry, in the office of Cotton, Truck, and Forage Crop Disease Investigations, made the Garden his headquarters for laboratory investigations from November 14 to December 4. While here he was representing the new Bureau of Markets, and made a study of the storage and transit diseases of vegetables and fruits, doing educational work at the same time with the newly appointed market inspectors. Dr. Link is also preparing a manual for the use of market inspectors.

On December 10 we received from Mr. Alfred T. White seven autograph letters written by the noted French botanist Francois André Michaux, from 1817 to 1827, to Dr. Francis, professor of materia medica in New York City. He traveled for twelve years (1785–1796) through Canada and the United States with his father, André Michaux, and published (1810–1813) a "Histoire des arbres forestiers de l'Amerique septentrionale," in 3 volumes, and "Travels to the West of the Allegheny Mountains." His death occurred in 1855. It is the father's name that appears on our building.

Prof. W. G. Farlow, of the department of botany, Harvard University, presented the Garden, on November 9, with a copy of Farlow and Seymour's, "Provisional host index of the fungi of the United States," Parts I–III, complete. The publication is rare, and is invaluable in plant disease studies.

Gift of Flagpole.—A flagpole of ash, primarily for indoor use, was presented to the Garden during October by Mr. Frederick Werner, 835 President St., Brooklyn. Mr. Werner's son has for some time been greatly interested in our children's work.

Gift of Books.—On October 26, the Garden library received as a gift from Mr. Leonard Barron, editor of the *Garden Magazine,* 91 books and 235 parts of publications. Some of the books are specially valuable for our library, comprising among other items, 16 volumes of the *Magazine of Horticulture,* Boston and New York, 1835–1854, and Mawson's *The Art and Craft of Garden Making.*

Gifts of Furniture.—On September 19, P. S. 36 presented a mission seat for our children's room. The seat was made in the manual training class of the school by three boys who have taken a great deal of the work offered in our gardening and greenhouse classes. The acting principal of the school has also taken our course for garden teachers. On November 14, two mission chairs and a coat rack were presented by P. S. 43. These pieces were made by members of our Boys Club who were pupils of P. S. 43. The furniture is for our children's room.

Torrey Club Anniversary.—On October 20 the Torrey Botanical Club, the oldest botanical organization in greater New York, and one of the oldest in the entire country, held the last of three semi-centennial meetings at the Garden. A scientific program, comprising twelve papers presenting the results of recent research, was held in the lecture room. Tea was served by the Garden staff, and the exercises closed with an inspection of the grounds. The two preceding meetings were held at Columbia University, on the 18th, and at the New York Botanical Garden, on the 19th.

Graduation of Garden Teachers.—On December 8 occurred the fourth annual exercises in connection with the conferring of certificates in children's gardening. The chairman of the Botanic Garden Governing Committee, Mr. White, presided. The address to the class was given by Miss Elizabeth Leighton Lee, director of the School of Horticulture for Women, Ambler, Pa. In 1914 (the first year) seven certificates were presented; in 1915, four; in 1916, thirteen; and this year, twenty-two.

One of the pleasantest features of these exercises has been the presentation of gifts to the Garden by classes and alumni. This year there were three such gifts, as follows:

1. A Botanic Garden flag of silk, about three feet by four feet,

colors green and white, bearing the words, "Brooklyn Botanic Garden." The green color was chosen as the one most appropriate for a garden flag, and the white in token of appreciation to the chairman of the Botanic Garden Governing Committee. The flag is not intended to fly from a flagpole, but for decorative purposes, and to be carried with classes and other parties being conducted about the grounds.

Fig. 1. Weather vane. Presented by the Class of 1916.

2. Metal weather vane, for the Children's Garden, designed by Miss Rebecca Dobbin, of the Nature Studio, Elk Ridge, Md. Presented by the class of 1916. (Fig. 1).

3. Rose arch, to be placed at the entrance to the walk leading to the Children's Building; designed by Mr. Harold A. Caparn, consulting landscape architect of our staff. The arch is of cypress, painted white, and was presented by this year's class.

Government Free Seeds.—The following quotation, from an interview with Senator W. S. Kenyon (New York *Times,* Sept. 2,

1917), is of botanical as well as political interest, and Senator Kenyon's suggestion is most admirable and timely.

"How quickly a new, or changed, viewpoint by the people makes itself felt on the man in Washington has been recently illustrated by a case that came to my notice. There has been great abuse in the distribution of free seeds, as everybody knows Think of sending out free seeds just to get votes, and that votes are got in this way! It has been costing the Government about $250,000 a year. In order to stop this free-seed 'pork' there has been a movement to ask those who receive the seeds to mail them back to Washington with the statement that they disapprove of sending out seeds in this way—in slang, that they won't stand for it any longer. I know of a member of Congress who got back 200 packages. He was much impressed—immeasurably more than he would have been by speeches in Congress on how wrong this system is. A few more packages, and I think he will be reformed. It shows how the people can instruct their representatives."

Dr. Gager addressed the New York Association of Biology Teachers on December 11, at Washington Irving High School, Manhattan, on "What the Brooklyn Botanic Garden is Doing and Planning for the Schools and the City."

"*Nature* states that the late Mr. Cawthorn left £250,000 to the city of Nelson, New Zealand, for scientific research. The trustees are the bishop of the diocese, the member for the district, the mayor of Nelson, two chairmen of local bodies, and a personal friend of the deceased. The site of the proposed institute has been purchased, and the appointment of a director and staff is under consideration. The object of the institute is, primarily, scientific research work for the benefit of the province of Nelson and the Dominion of New Zealand. The province of Nelson is mostly concerned with fruit, agriculture and minerals" (*Science*, Nov. 23, 1917). It is, indeed, an encouraging thing to see municipalities enlisted, not only in the diffusion of popular scientific information by public museums, botanic gardens, and otherwise, but in the promotion of scientific research—cooperating in the enrichment of the source whence all "popular" information is derived.

Botanical War Emergency Work.—The American Phytopathological Society have appointed a War Emergency Board comprising seven Commissioners, as follows: H. H. Whetzel, Chairman, Commissioner for the North East, Education: College and Extension, Cornell University, Ithaca, N. Y.; H. P. Barss, Commissioner for the West, Western Problems and Needs, Agricultural College, Corvallis, Oregon; F. D. Kern, Commissioner for the Central East, Man-power Census and Publicity, Agricultural College, State College, Pa.; E. C. Stackman, Commissioner of the Great Plains, Emergency Research, Agricultural College, St. Paul, Minnesota; H. W. Barre, Commissioner for the South, Southern Problems and Needs, Agricultural Experiment Station, Clemson College, S. C.; G. H. Coons, Commissioner for the North Central States East, Fungicides and Machinery, Supplies and Prices, Agricultural College, East Lansing, Mich.; G. R. Lyman, Commissioner at Large, Plant Disease Survey and Crop Loss Estimates, U. S. Dept. of Agr., Washington, D. C.

The United States has been divided into six districts, with a commissioner in each and one commissioner at large. A "Call to the colors" has been issued to every botanist in the United States and Canada, and pathologists in each district are urged to cooperate with the commissioner for that district.

Emergency projects already defined and assigned are as follows: (1) Man power census; (2) Publicity campaign, to acquaint the general public with the economic importance and need for public support of plant disease control work; (3) Fungicides and machinery, including plans for assuring to the farmer, at a fair price, an adequate supply of reliable fungicides, disinfectants, and machinery for their application; (4) Emergency research. Research men are asked to redirect their work, or turn to new problems of immediate concern; (5) Plant disease survey, now under way; (6) Crop loss estimates, the securing of accurate estimates as to the annual losses due to plant diseases; (7) Education: college and university teaching; (8) Education: Extension work.

A Proposed Botanical Abstracts Journal.—What is probably the most important movement ever inaugurated by American botany is the plan, launched at the Pittsburgh meeting of the Botanical Society of America, December 28, 1917–January 2, 1918, for the establishment of a journal of botanical abstracts. Over a quarter of a million pages of botanical periodical literature are published annually, and it has become quite impossible for investigators and teachers to keep abreast of this literature, even in restricted departments of the science. As a result of the war the international abstract journal, *Botanisches Centralblatt,* published for a number of years past in Germany, has ceased to appear, at least in the countries of the Allies. Plans now maturing for the new journal aim to make it international in scope, and to cover the entire field of botany in the widest sense of the term, including both pure and applied science, and embracing bacteriology, forestry, pharmacognosy, plant raw products, foods and fibres, horticulture, agriculture, agronomy and botanical education, as well as the commonly recognized subdivisions of botanical science—pathology, morphology, physiology, cytology, systematic botany, paleobotany, ecology and plant geography, and genetics. An editorial board is being organized, and plans are under discussion for securing the financial support that will be necessary until the journal shall become self-supporting. A governing committee on the new journal was elected as follows: J. H. Barnhart, New York Botanical Garden; H. C. Cowles, University of Chicago; B. M. Duggar, Missouri Botanical Garden; C. S. Gager, Brooklyn Botanic Garden; R. A. Harper, Columbia University (Chairman); B. E. Livingston, Johns Hopkins University (Editor-in-Chief); F. C. Newcombe, University of Michigan; Donald Reddick, Cornell University; C. S. Shear, Bureau of Plant Industry, Washington, D. C.; and Forrest Shreve, Carnegie Institution (Desert Laboratory), Tucson, Arizona.

The opportunity for the launching of this journal is now at hand; it may not recur, and no more important nor more urgently needed service could now be rendered to botanical science than to make possible the early realization of the plans now maturing.

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THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

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SEVENTH ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN, 1917

REPORT OF THE DIRECTOR

TO THE GOVERNING COMMITTEE OF THE BOTANIC GARDEN:

Gentlemen: I have the honor of presenting herewith the annual report of the Brooklyn Botanic Garden, of the Brooklyn Institute of Arts and Sciences, for the year 1917.

Completion of Buildings and Plant Houses

The outstanding event of the year was the completion of our laboratory building, children's building, and first range of plant houses, a little over seven years after the first rough floor plans were submitted to the architects for study and elaboration. Accounts of the dedication exercises, held on April 19–21, were published in the Botanic Garden RECORD for July, 1917, in the daily papers of Brooklyn and Manhattan, and in various scientific periodicals. The cooperation of forty-one of the leading botanists of the United States, east of the Mississippi River, in our dedication programs was most gratifying, and made the exercises a notable event in the scientific and educational history of Brooklyn.

The programs and dedication addresses were published in the Botanic Garden Record for July, 1917.

I cannot refrain from expressing to the Committee the sincere appreciation of the director and staff of the unlimited freedom we enjoyed in planning the buildings, not only in their general features, but in the details of floor plan and equipment. We labored under no restrictions within the limits of architectural demands and financial resources, and if the buildings are not, in the fullest measure, adapted to the work of the Garden as now planned and organized, the fault cannot be attributed to superimposed limitations.

On March 17, we moved the Garden offices from the temporary quarters in the first section, which we had occupied for three and a half years, or since September 25, 1913. The terazzo floor was not then laid in the corridors, and much of the interior finish was still to be done. On April 10 the Governing Committee held its first meeting in the new building in the director's office.

Significance of the Completed Buildings

The urgent need of the completed buildings was set forth in my annual report for 1914, and was also reviewed in the several dedication addresses—how the attendance at our classes and lectures had entirely outgrown the limited capacity of the first section, completed in 1913; how our scientific collections could no longer be accommodated so as to be accessible and usable; and how the members of staff, in various ways, were not able to render to the Garden their full measure of service. It is not necessary to review the situation here in detail, nor is there inclination to do so, for our faces and our thoughts are forward to the wider opportunities and the larger privileges and accomplishments of the future.

What the completion of the buildings has meant and is to mean is nowhere better reflected than in the large increase in attendance at every Garden activity during 1917. In comparison with 1916, the figures are as follows:

COMPARATIVE STATISTICAL DATA FOR 1916 AND 1917

Attendance	1916	1917	Increase
Regular classes	14,070	26,794	90 + %
Visiting classes	8,504	12,024	41 + %
Lectures			
To children	6,448	10,642	60 + %
To adults	744	1,995	168 %
Conservatories	18,190	29,328	61 + %
Entrance gates (estimated in part)	362,946	509,285	40 + %
Registration in regular Garden classes	2,614	4,083	56 %

The point here emphasized is that this large increase in attendance at lectures and classes, averaging nearly 74 per cent., has not been accompanied by any increase in staff, nor is it due to any increased publicity or other attempts to secure larger numbers, for there have been none. With reasonable allowance for normal annual growth, it is to be attributed almost wholly to the fact that we can now accommodate more people. That we are now able to present figures of such magnitude for total yearly attendance is convincing evidence that the Botanic Garden is supplying a real need in the community, and has thereby justified its establishment.

The Garden and the War

Plans for the year's work, as first projected, were profoundly modified by the entrance of the United States into the war, on April 6. The development, for botanic garden purposes, of four large tracts, was abandoned, and the areas were devoted to "win-the-war" gardens. These areas include that in front of the laboratory building and plant houses, a tract of about one acre on the south addition (west of the brook), the area surrounding the experimental garden (south of the plant houses), and a portion of the land between the Museum building and Mt. Prospect reservoir.

Model Small Vegetable Garden.—On April 19, the head gardener gave a public demonstration of the planting of a small vegetable garden, 20 ft. × 40 ft., and this garden was carried through the season, as a model garden of its kind. In this connection a special *Leaflet*, on "The Small Vegetable Garden," was

issued, and about 3,000 copies were called for. These figures have added significance in view of the fact that the extra copies were not distributed broadcast, regardless of demand, but were given only to persons who asked for a copy. In other words the number of copies distributed is a measure of the number of interested persons who were reached.

Gardening Class for Older Boys.—One of the chief obstacles, if not the chief one, to increased food production on farms is the scarcity of competent help. Early in the spring various movements were inaugurated for getting city boys, of high-school age or thereabouts, onto farms, but their almost entire ignorance of farm practices proved a nearly insuperable handicap. As our "bit" toward the solution of this problem we laid out 23 individual plots of 20 ft. × 40 ft., and announced in all the high schools of the Borough, a course of instruction for older boys (sixteen to eighteen years of age). Twenty boys took advantage of this course. The remaining three plots were cultivated by two high-school teachers and one of our own men who acted as instructor of the boys.

Gardens for Employees and Policemen.—The area above referred to, east of the brook, was planted to potatoes, and, in addition, 13 plots, 20 ft. × 40 ft. were assigned to our own employees; and a large area between the Museum and the reservoir to members of the uniformed police force, in both cases for cultivation outside of regular hours.

The total number of individual gardens cultivated on our grounds by children and adults was 427.

We also plowed and cooperated in the fertilizing of about an acre south of the Museum (the site of the future sections of that building). This was cultivated by Museum employees, and the top soil will eventually become available for the Botanic Garden.

Cooperation with Mayor Mitchel's Committee on Food Supply.—In cooperation with this committee the Garden offered the entire time of an expert gardener to inspect vacant lots and other parcels of land, and to give advice on planting to individuals and groups. This was made possible by a gift from the chairman of the Governing Committee of the Garden. One hundred and

thirty-nine gardens were inspected, varying in size from one hundred square feet to twenty-two acres, and located in all parts of the Borough, from East River to Coney Island and from Brooklyn Heights to Brownsville.

We also served as the center and agency for the distribution of seed potatoes for Brooklyn. The potatoes were supplied by Mr. M. Maurice Eckstein, Supervisor of Purchases, of the United Fruit Co., at the cost price of $2.83 a bushel, while the price in local retail markets fluctuated around $4. One hundred and forty-eight bushels were distributed.

Cooperation with the Federal Government.—From November 14 to December 4, laboratory facilities were afforded to Dr. George K. K. Link, who was investigating the storage and transit diseases of fruits and vegetables of the newly established Bureau of Markets, of the United States Department of Agriculture.

Demonstrations of Canning.—There have been two demonstrations of canning vegetables held in our laboratories. The first, on July 27, was before the Flatbush Garden League and our own students. The second, on September 18, was primarily for our own students. The general public was invited to both.

Shortage of Coal.—In anticipation of a possible shortage of coal during the winter of 1917–18, about 241 tons of pea coal were stored in the yard between the building and Washington Ave., in addition to about 225 tons, which is the approximate capacity of the coal cellar. The total normal consumption is about 800 tons a year. During most of December only one half of the laboratory building was heated.

Employees in the National Service.—One of our laboring force enlisted in the National Guard, and one of the gardeners was drafted into the National Army during the fall. Nearly all of our employees have been above the draft age.

Public Appreciation and Response

Does the public appreciate its museums, art galleries, zoological parks, and botanic gardens in general, and in particular, does the Brooklyn public appreciate the Brooklyn Botanic Garden? "I suppose," wrote a somewhat skeptical correspondent in a re-

cent letter to the director, "the real trouble is to induce the people to accept the good things they provide for themselves."

The shortest and most convincing answers to that question and doubt are the figures of attendance given above (p. 00), particularly those for classes and lectures. The total attendance of 80,783 at our own classes, visiting classes, lectures, and conservatories, represents, on conservative estimate, over 40,000 different individuals. This takes no account of the half million or more entrances registered at our entrance gates. People may go to a botanic garden for a variety of legitimate and commendable reasons, but we here emphasize the fact that the more attractive we made the Garden, *botanically,* the greater our attendance becomes, and the more rapidly it increases. We have never made any attempt, beyond opening our gates, to induce the general public to come, except on two or three occasions when we have inserted in the daily papers a reading notice of some course of instruction for which a fee was charged. Special attention is here called to the report of the curator of elementary instruction (p. 00) that, in October, applications were received from public-school teachers for talks to over 2,000 children more than we could care for.

Of course figures of attendance always involve some duplication, for the same individual may attend more than once. But as an argument against the validity or significance of statistics of attendance this fact is irrelevant, for the value of botanic gardens and museums (or even of parks) is not to be measured solely by the number of different individuals who attend once, any more than in the case of schools, churches, or rapid transit lines. The value to a community of having such institutions is derived largely from the fact that they are freely and easily accessible at all times, and may be visited by the same person over and over again. A botanic garden, in particular, offers something new and interesting at almost every month, and must be visited several times a year if one seeks to enjoy its fullest advantages. This applies both to the various lectures and classes, and to the ever-changing panorama of foliage, flower, and fruit, as well as to those who seek in beauty and variety of surroundings physical and mental

recreation, and relief from the artificial enviroment of city streets and buildings. The tourist in a given city may be restricted to *one* visit "to see the museum," or "to see the botanic garden," but the local residents enjoy the larger advantage of being able to go as often as they like, not for the vague purpose, "to see the garden," but to study the collections, and take advantage of the varied opportunities which the institution affords for education, inspiration, and recreation.

The number of requests we receive for information about plants, gardens, and botanical literature, by mail, telephone, and personal calls, is constantly increasing, as is also the public use of our library and herbarium. During the past year several local botanical organizations and garden clubs have welcomed, and have been welcomed by, the Garden as a meeting place.

Investigations

Tree Disease Survey.—In my preceding annual report (p. 39) I noted the beginning of a survey of the diseases of the trees and shrubs of Prospect Park and the Garden, by Prof. George M. Reed, of the University of Missouri. A report of the first season's work was published in the RECORD for January, 1917. Dr. Reed was able to resume his work as resident investigator on April 1, 1917, and was thus able to study and collect various forms and stages of pathogenic organisms not collected in 1916 owing to the late season (June 15) when the work was begun. Dr. Reed remained in residence until the twelfth of September. His final report will appear in the Botanic Garden RECORD for January, 1918. Much valuable information has resulted from this study, and our herbarium collections have also been greatly enriched by specimens collected and prepared by Dr. Reed. It would be desirable to have this work further continued through the late fall, winter, and early spring, if arrangements could be made by Dr. Reed for leave of absence from his regular duties at that time of year.

Plant Breeding.—Experimental investigations of heredity and variation in peas, castor beans, and corn, as reported for preceding years, have been continued by and under the direction of the

curator of plant breeding. In addition, the various varieties and species of poppies have been made the subject of a preliminary survey in order to determine their fitness as suitable material for the elucidation of certain problems in the field of heredity.

The studies on peas, castor beans, and corn have yielded a large amount of data concerning inheritance in plants and by extension, inheritance in general. Part of these data have been made available to those especially interested, and to the general public, through the publication and reading of the papers mentioned in Appendices 1 and 2.

Peas have furnished by far the best material for theoretical studies, and in collaboration with the Bureau of Plant Industry of the U. S. Department of Agriculture, between two and three hundred of the most distinct varieties and species have been assembled. Among these are all the described wild and semi-wild forms from the original home of the pea in southern Europe, western Asia, and northern Africa. Especially peculiar and interesting forms have been secured from the Lebanon mountains, the Abyssinian plateau, and the dry hot regions of western China. Greenhouse and field cultures of these various kinds have been grown from year to year, from which dried specimens, representing the numerous forms in all stages of growth have been obtained. Pure strains have been isolated from these cultures and pedigree records of them kept. Thousands of successful crosses between these varieties and species were made last spring, the results of which eventually mean thousands of new varieties, some of which may have decided commercial value.

Studies on the inheritance of the complex group of characters which determine the various differences in productiveness among pea varieties are being especially emphasized, as well as the relation of different environments to this problem. Pea varieties differ in productiveness enormously when grown under approximately the same conditions. Some varieties have only 2–4 small pods per single plant, while other varieties average over 100 large pods per plant. Single plants have been reported with as high as 650 pods averaging 5 peas per pod. Eventually through these studies it is hoped to make known the manner of inheritance of

all the characetr differences in peas (for over 70 of which, this is already known, in some detail) and from this knowledge, to be able to synthesize a desired variety by bringing together the specified characters through crossing, much as one does in chemistry in making new and much desired compounds. Material as favorable for the theoretical study of heredity and variation as are peas, is rare, and it is needless to point out how obviously agricultural and horticultural breeding are dependent on theoretical studies of heredity and variation and the determination of their laws.

The experiments on castor beans involve the same aims as those mentioned for peas, though the material is of less value from a theoretical standpoint. The inheritance of several characters of economic value has been elucidated. When applied to the commercial growing of these beans for oil, knowledge of the heredity of these characters may prove of decided importance. The castor bean collection has been enriched by the gift of over two hundred new forms, representing commercial, wild, and semi-wild types from all over the tropical and semi-tropical world. These were obtained through the kindness of Prof. J. B. S. Norton, botanist of the Maryland Experiment Station. Owing to the importance of aeroplanes in winning the war, the castor-oil plant, through the value of its oil as an aeroplane lubricant, has become very important. Great differences in productiveness, time of maturity, and other characters, exist among the varieties of this plant, and so far as the writer is aware, no attempt at securing improved varieties has yet been made.

The studies of inheritance on various characters of corn, several of which involve productiveness, have been continued by Miss S. G. Streeter, registered student at the Garden, under Dr. White's direction.

At present the plant breeding and heredity work is much hampered through lack of sufficient greenhouse space for growing winter cultures, and through insufficient clerical and gardening assistance for keeping pedigree records and taking proper care of the cultures. No considerable extension of the summer work will be possible unless additional space can be secured for field

cultures. As mentioned in a previous report, a culculating machine of the best and most accurate type is specially needed for the statistical side of the work.

Cotton Rust Investigation.—In connection with the recent sudden outbreak of cotton rust in southern Texas, Dr. Olive was, last July, asked by the Federal Horticultural Board, of the U. S. Department of Agriculture, to go to Texas to make an investigation and report. This disease was supposed to have invaded the United States from Mexico, and grave fears were entertained that, if not checked, it might spread over the entire cotton belt, inflicting thousands of dollars worth of damage. Dr. Olive's report of this trip was published in the RECORD for October, 1917.

Flora of Long Island.—Mr. Taylor has continued during the year his study of the vegetation of Long Island, making numerous trips for field studies and collecting.

Boston Fern Investigation.—During 1917, the study of *Nephrolepis* was continued along the same lines as during the previous years. The plant collections were several times moved and rearranged until finally concentrated in House No. 1, set aside for their special requirements. New accessions were received from time to time, in particular two collections of *N. exaltata,* made by Dr. J. K. Small in Florida. Several sets were distributed both to florists and to educational institutions, the latter of forms representing the progressive (orthogenetic) variations already described (Brooklyn Bot. Gard. *Contributions* No. 13, and elsewhere). There was also some distribution of illustrations of the latter for use in textbooks and lantern slides. The problems under investigations have been a continuation of those begun in previous years. A second annual appropriation ($100) from the American Association for the Advancement of Science, granted to Dr. Benedict, became available in May, and has been partly applied to expenses connected with visits to florists.

Plantations

Maintenance.—Details of this work are given in the appended report of the curator of plants (p. 00–00). As the Garden becomes more intensively planted the need is for more skilled

gardeners. In my report for 1916 I urged the necessity of at least two additional gardeners by 1918. They were appointed on the private funds pay-roll for 1917, and the Board of Estimate and Apportionment has approved our city budget request for these two positions for 1918. As soon as the war is over (at the latest) we should have the entire time of one gardener at each of the following seven centers and adjacent areas: Japanese garden, rock garden and ecological section, iris garden, native wild-flower garden, general systematic garden (upper section), general systematic garden (lower section), children's garden and vicinity of Malbone St. gate. A man is needed at each of these stations for the double purpose of gardening and guard duty. The installation of additional collections will create other similar centers.

White Birch Disease.—The most injurious plant disease in the brief history of the Garden first appeared in 1916 among the white birches. From the observations of the resident investigator, Dr. Reed, it would appear that the primary cause of the trouble is the bronze birch borer, followed by one or more parasitic fungi. The satisfactory treatment and control of this infection is very baffling, and, so far, every infected tree has died, leaving many bare and unsightly spots, especially near the Japanese garden, and elsewhere around the lake. A full account is included in Dr. Reed's report.

Statistics.—A total of 651 living plates were added to the collections, and 422 were distributed by exchange. Seed packets received by gift and exchange 401 ; distributed by exchange 470.

Iris Garden.—The margin of the brook, on either side, has afforded a suitable location for the iris collection. About 15 species and 90 horticultural varieties of Japanese, Spanish, German and other groups of iris were planted last fall, covering a stretch of about 300 linear feet along each side of the brook. The majority of the plants were donated by growers, and the collection should ultimately stimulate a wide public interest in this group. The individual gifts are acknowledged on page 00. The planting may ultimately be extended along the margin of the lake, and further gifts for this collection would be most welcome.

Rock Garden.—Some 200 or more species of saxitile plants

were added to the rock garden during 1917, making the total number about 400. Many of the larger boulders have been split so as to permit planting in the crevices. For this work the Graden is indebted to Mr. John Thatcher, Brooklyn. Several flowering crab apple trees were planted in the fall at the north end of the garden, so as to shut it out from view as one approaches from that end.

Lilac Collection.—Most of the 130 varieties planted in 1916 have become established, but the war put a stop to any considerable additions, as many of the varieties we do not have can be obtained only from European nurserymen.

Conservatories

The completion of the present range of plant houses, as planned, afforded much relief to the badly congested sections first built. Gifts of plants are acknowledged in the appended report of the curator.

Attendance.—Although the conservatory collection has been only about one third installed, and no special effort made to attract the public, the number of visitors increased much more than 61 per cent. over 1916, reaching a total of 29,328.

Herbarium

Accessions.—A total of 4,119 herbarium specimens were accessioned, including 2,737 phanerogams and 1,382 cryptogams. A detailed statement occurs in the appended report of the curator of plants.

Ames Bequest.—The largest single accession during the year comprised about 517 specimens of fungi, mainly woody, bequeathed to the Garden by the will of the late Frank H. Ames, who was a frequent visitor to the herbarium and library. The gift also included 42 books and 18 pamphlets, chiefly on fungi, and interesting correspondence with American mycologists. A fuller statement will be found in the Garden Record for January, 1918, to be issued before the publication of this report.

Library

The addition of 398 books and 475 pamphlets (not including parts of publications), was a very modest growth, and, considering that one-half the books and nearly all the pamphlets were gifts (p. 00), reflects our altogether too inadequate funds for the purchase of publications. The librarian reports 306 current periodicals on file, as of December 31, an increase of 48 over 1916. Of these 240 are received in exchange. The average number per month of users of the library has increased by nearly 53 per cent. since we moved from temporary quarters in March. In December about 400 books were sent to the binder; as many more are ready for binding as soon as funds are available. The need of an assistant in the library is extremely urgent.

Department of Public Instruction

Children's Work.—Like most of the other Garden activities, the children's work was more or less colored by the war situation, both in the lecture topics and courses of instruction, and in the contents of the children's gardens, vegetables almost wholly supplanting flowers. The appended reports of the curator of public instruction and the curator of elementary instruction (pp. 00–00) give the details of this work; attention is here called to only a few outstanding features.

Children's Gardens.—The children's gardens comprised this summer 290 individual plots, 8′ × 10′. The curator, Miss Shaw, and the assistant curator, Miss Cross, have had the assistance of the 22 young women in our teachers' training class. Two of these pupil-teachers have been twice a week all summer to the garden connected with Public School No. 82, two others to Public School No. 24, and still two others have taken charge of a small garden at Public School No. 22. Every Friday afternoon our students have spent their time in visiting about 150 back-yard gardens under our supervision, located in various parts of the city.

On two consecutive days during one week in July, there was taken from the main children's gardens, which include 264 plots, each 8′ × 10′, crops to the market value of $173.52. This is an average of what was taken from these gardens during like periods

for several weeks. Requests for plots in the children's gardens for next year began to be received on September 20.

In addition to the 290 gardens mentioned above, 60 gardens 10 ft. × 20 ft., and 40 gardens 20 ft. × 40 ft. were cultivated, partly by older children and partly by adults.

Fourth Annual Children's Garden Exhibit.—The fourth annual children's garden exhibit was held on September 14 and 15. The plants were exhibited for the first time in the new range of greenhouses which are to be the permanent home of the indoor classes for children and adult classes. Contrary to our experience during the preceding three years, the majority of the exhibits this year were vegetables, reflecting the result of the food campaign.

Penny Packets of Seed.—During the spring 120,755 packets of seed were sold to children of the public schools. This is nearly 5,000 more than were sold last year. The food situation was here also reflected, as fewer flower seeds were called for and many more vegetable seeds. For example, last year (1916) we had calls for only about 1,000 packets of onion seeds, whereas this year the number was about 6,000. More could have been sold if we had had the seeds.

Children's Room.—It was hoped that a portion of the unexpended balance of the appropriation for the permanent improvement of the Garden could be applied to finishing the children's room, including window seats and wall cases, but such was not the case. The Garden has been an important factor in the lives of several thousand boys and girls of Brooklyn during the past five years, and it is hoped that funds may soon become available for furnishing the childrens' room in an attratcive manner.

Cooperation with Schools.—During the spring and fall 82 addresses were delivered outside of the Garden, chiefly to public schools, an increase of 14 over 1916. The total number of auditors at the addresses was estimated at over 27,700, as compared with about 18,500 in 1916.

A total of 153 school classes, from 25 different schools, visited the Garden in charge of their teachers, each class receiving a special talk, usually illustrated, bearing on the exhibit they came to see.

Fuller details of this work are given in the appended report of the curator of public instruction (pp. 00–00).

Graduation of Garden Teachers.—On December 8 occurred the fourth annual exercises in connection with the conferring of certificates in children's gardening. The chairman of the Botanic Garden Governing Committee, Mr. White, presided. The address to the class was given by Miss Elizabeth Leighton Lee, director of the School of Horticulture for Women, Ambler, Pa. In 1914 (the first year) seven certificates were presented; in 1915, four; in 1916, thirteen; and this year, twenty-two.

Woman's Auxiliary

In my two preceding annual reports I called attention to the desirability of a woman's auxiliary. It is a pleasure to announce that such an auxiliary was formed on Thursday, March 8, at the home of Mrs. Alfred T. White. Mrs. H. B. Spelman was elected president, and Mrs. Thomas D. Hewitt, secretary. The formation of the Auxiliary was specially welcome at that time, on the eve of the dedication of our buildings. The success of the reception on that occasion was due chiefly to their efforts, acting through the social committee, of which Mrs. William Cary is chairman. The Auxiliary also cooperated with the Garden Teachers' Association in serving tea at the graduation of our teachers' class, on December 8.

Annual Spring Inspection

The third annual spring inspection of grounds, buildings, and collections by trustees, members of the Garden, and their freinds, was held on May 22. On account of the unseasonable low temperature, tea was served by the Woman's Auxiliary in the rotunda of the laboratory building, instead of in the Japanese Garden, as originally announced.

The Staff

There have been no changes in the scientific staff during the year.

Garden Membership

On account of the war, no effort has been put forth this year to enlarge the membership. Nine new members were enrolled, including one life, two sustaining, and six annual. The total membership on December 31 was 113, as follows: 94 annual, 11 sustaining, 2 subscribing, 6 life; lost by death 4, by resignation and suspensions 8, making a net loss of four.

Employees

Number of Monthly Employees.—The monthly pay roll for December showed a total of 32 employees, of which 18 received all their salaries from the City tax budget, 7 from private funds, and 7 from both funds.

New Positions.—Taking possession of our new and enlarged buildings made it necessary to create three new positions last year, namely, custodian and registrar, painter and glazier, and cleaner. The salaries of the first and last mentioned were met from private funds, but the positions are recognized in the City appropriation for 1918.

In order to release the head gardener for war-garden inspection, two positions of *foreman gardener* were created and filled by the promotion of two gardeners. Two new gardeners were appointed, one primarily for the children's gardens and adjacent area. The salaries of these two gardeners were also provided by a special contribution of private funds.

Per Diem Labor.—The number of day laborers varied from 18 near the beginning of the season to an average of nearly 11 toward the close, with a total number of 2,956 labor-days. Further details are given in the appended report of the curator of plants (p. 54).

Publications

Record.—Volume VI of the Brooklyn Botanic Garden Record, appearing quarterly as usual, contained 174 pages, and 13 half-tone illustrations, an increase of 14 pages over 1916.

Leaflets.—Series V of the *Leaflets* comprised 14 numbers, appearing weekly or bi-weekly between April 4 and October 17.

As mentioned above several greatly enlarged issues dealt with war-garden topics.

Contributions.—Four numbers have been published during the year, making a total of 19.

American Journal of Botany.—The fourth volume of the *Journal* contained 641 pages, 94 text figures, and 31 plates, an increase of 48 pages over 1916. As a result of the increased cost of production and a slight falling off in advertising the publication of the *Journal* for 1917 involved a deficit of $269.58. Sixty-five periodicals are now received in exchange for the *Journal.*

Memoirs.—For the first time the *Memoirs* may be referred to as more than a project. The manuscript for the first number, comprising scientific papers read at the dedication exercises, is nearly ready for the printer, and the volume should appear in the early spring of 1918.

Miscellaneous.—The *Prospectus of Courses* for 1918 was reprinted in December, as advance pages from the RECORD for January, 1918.

The interruption of botanical and other scientific work in Europe by the war has interfered with seed exchange with European botanic gardens. On this account we did not print an entire new *Seed List* for 1917, but issued a *Supplement,* which was mailed with copies of the 1916 *List.* The *Supplement* contained 184 new names, but, owing to our own absorption in war-garden work, the net number of species collected in 1917 was only 922, or 69 less than in 1916.

Individual publications by members of staff (listed on pages 00–00) total 34 articles and papers. It should, perhaps, be pointed out that the number of titles is here not the important or significant fact, but the character of the publication; figures are given merely as a part of the statistical record.

Financial Matters

City Appropriation for Maintenance.—The request in the City tax budget for maintenance of the Garden for 1917 was $48,966.05; the amount granted was $40,151.00 (on the original tax

budget appropriation) plus $3,107.94, transferred from Code 3016 (Interest on bonds, corporate stock, and corporate stock notes to be issued from October 1 to December 1, 1916, and to September 30, 1917), a total of $43,258.94. The transfer was for the purpose of providing funds for the additional coal necessary to heat the enlarged laboratory building and plant houses.

There was a deficit on all accounts chargeable to the City, for necessary expenditures (including salaries and wages, supplies, materials, repairs, light, heat and power, and traveling expenses), of $8,512.68, or substantially the difference between the appropriation requested and that granted by the City. The deficit was met from private funds, to the detriment of the enrichment of our collections, and the extension of our educational and scientific work.

Of the total expenditure for personal service, $40,650.77, a little over 80 per cent. ($32,760) was paid by the city, and nearly 20 per cent. ($7,890.77) from private funds.

Corporate Stock Balances.—Of corporate stock appropriations there is a balance, as of December 31, of $1,422.13 on C. D. P. 200-M ($100,000.00 for Improvement of the Brooklyn Botanic Garden), and $1,845.94 on S–566 ($100,000.00 Suspense Account, Contribution for Botanic Garden Improvement Fund). Estimates have been secured for open market orders for equipment that will reduce these balances to less than $500 on each account. Corporate stock account C. D. P. 200–J ($40,000.00 for grading, draining, piping, and soil improvement) is practically all expended (balance 15 cents).

Private Funds.—The total income from all sources was $18,206.05. Of this amount, $4,742.50 went for monthly salaries that should be met from the city appropriation, including those of secretary to the director, custodian and registrar, two gardeners, and cleaning woman. The last four of these salaries will be assumed by the City in 1918. The wages of per diem laborers were paid from special contributions after June 23, to a total of $3,148.27. Of the total income, only $10,315.28 was available for the increase of our collections, and our scientific and educational activities.

Needs of the Garden

Previous to April, 1917, the most pressing needs of the Garden were material. As Archimedes's sole condition for moving the world was that he should be given a suitable place on which to stand, so our *conditio sine quo non* for building up conservatory collections, and the prosecution of research and public education, was the possession of adequate housing accommodations—a place to stand. By the completion of our laboratory building and plant houses we are now fairly well domiciled, and, while a large amount of construction work remains to be done, especially on the grounds, the next few years should witness a more vigorous development and extension of the work for which our material equipment has been provided.

Research.—Fundamental to all else is research. The greatest need of botany, the greatest need of the people from botany, is a deeper and wider knowledge of the principles of plant life and their practical application, in agriculture, horticulture, floriculture, forestry, plant pathology, and other applied sciences. The judicial expenditure of very large sums for botanical research can be justified, not only from the scientific, but also from the financial point of view. Here is not the place to enlarge upon this theme, but the director of the Garden will be very glad to give concrete suggestions and detailed information to anyone who may wish to learn further of our aims and ideals in this direction, and to become acquainted with the nature of the problems to be solved and the urgency of their solution. As I have elsewhere emphasized,* no error could be more disastrous than an attempt to build here a superstructure of public education concerning plants, without a suitable foundation in botanical research. The proper development and care of our collections demand this, as well as does the work of public education, and the efficiency of our staff. Plans already outlined† should be matured at once for meeting this need by creating and filling certain new curatorships, and providing for the necessary research

* Brooklyn Bot. Gard. Record 6: 121–130. July, 1917.

† Brooklyn Bot. Gard. Record 6: 83–89. April, 1917.

assistants, laboratory equipment, and herbarium and library expansion.

It is now coming to be generally recognized that a great opportunity for leadership has come to America as a result of the world war. Science in general, and botanical science in particular, share in this opportunity, and the close of the war should find such institutions as ours with plans matured to meet it, and ready to carry forward the work already initiated.

Attention has already been called in previous reports to our need of a new fence to enclose the Garden, suitable entrances, a plentiful number of attractive seats in all parts of the grounds, and several other items of a like nature. The beauty and interest of our grounds may also be greatly enhanced by placing, at various effective points, busts of botanists and of benefactors of the Garden, memorial seats, and other incidental pieces of sculpture and architecture. A number of drinking fountains, of the bubbler type, should be provided for the comfort of our visitors. To complete the esplanade, a water basin and fountain are needed at the lower end. It could be supplied with water from the proposed basin and fountain at the museum embankment at the upper end. The construction of the inner walks along either side of the esplanade, and the planting parallel thereto also remain to be done.

Acknowledgments

The greatest value of all gifts to such institutions as ours is the evidence they afford of interest in our work, sympathy with our aims, and a disposition to cooperate toward successful accomplishment. From this angle, small gifts are as valued as larger ones. Individual gifts have been acknowledged during the year, as received, with the thanks of the trustees, and are enumerated in the appended reports of the curators and the librarian. It is a pleasure to record here renewed expressions of appreciation on behalf of the director and staff. Donations to the Botanic Garden Collections Fund, 1917, from the following, have not elsewhere been publicly acknowledged.

SUBSCRIBERS TO THE BOTANIC GARDEN COLLECTIONS FUND, 1917

Mrs. John Anderson
Samuel P. Avery
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The Misses White
Miss Mary B. Woodward

Especially appreciated are the gifts from our graduates, and from the Garden Teachers Association of the Brooklyn Botanic Garden, recorded in full in the RECORD for October, 1917; gifts of $7 for shrubs, and $25 for a flag, also for the children's gardens, by our Boys Club and Girls Club; one mission seat from Public School 36, and two mission chairs and a coat rack from Public School 43. This furniture, for our children's room was made by public school pupils who are members of our Boys Club.

The Mothers Club of P. S. 81, Queens, presented four plants of "Dorothy Perkins" rose for our children's garden, and similar gifts are acknowledged from the Mothers Clubs of Public Schools 66, 85, 88, and 113, Brooklyn, and from the Bay Ridge High School, Brooklyn.

Accompanying Papers

The following papers and statements are appended as a part of this report:

1. Annual report of the curator of plants.
2. Annual report of the curator of public instruction.
3. Annual report of the Librarian.
4. Financial statements of municipal appropriations and private funds accounts.
5. Appendices 1–

Respectfully submitted,

C. Stuart Gager,
Director of the Garden.

REPORT OF THE CURATOR OF PLANTS FOR 1917

Dr. C. Stuart Gager, Director:

Sir: I take pleasure in submitting my report for the year ending 31 December, 1917.

General Maintenance and Construction Force

The laboring force worked from 25 March to 30 November. During the 7 busiest weeks there were 17 laborers, for 20 weeks 12 men, and for the remaining 9 weeks an average of nearly 11 men. In this connection I should like to draw attention to the following table which shows the number of labor days for each of the years since the Garden started. Such days are calculated on the number of men employed in the force multiplied by the actual days they worked.

	Labor Days	Acres in the Garden *
1911	1,364	39 +
1912	2,424	39 +
1913	2,442	42 +
1914	2,832	42 +
1915	2,822	50 +
1916	3,540	50 +
1917	2,956	50 +

From 1912 to 1916 we were occupied almost entirely with construction work and the opening up of new collections, new lawns,

* Not necessarily indicating when acreage was added to the Garden, but when actual work on it was started.

Fig. 3. Laboratory Building. View of Central Rotunda, Facing West Main Entrance.

etc., and our average labor days for these five years was 2,812. Now that more of our grounds are in a state demanding, day by day, more care than ever before, we had in 1917 only 2,956 labor days. These figures merely draw attention in concrete form to what has been obvious enough for years past, the inadequacy of our regular maintenance force to keep the Garden in anything like the condition desired: this, without considering development plans now waiting to be carried out.

The chief new work done this year has been: plowing, harrowing, etc., a good deal of land given over to "war gardens," both of our own men and for various city employees; grading and terracing on the west side of the Laboratory Building, grading and terracing service yard, digging trench at the north end of the Laboratory Building; making beds for the Iris garden; surface grading and putting down to lawn the triangle near the brook to be occupied by beds of Polygonales in the Synoptic Collection. General maintenance work has been heavier than ever before because of the greatly increased area under cultivation. As heretofore, Mr. Herman Kolsh, foreman, has been in charge of this work.

Gardening Force

Gardening operations have been in charge of the Head Gardener, Mr. Montague Free, who, besides looking after the collection of seeds and preparation of the exchange seed list, has given a good deal of time to inspecting 139 "war gardens" in Brooklyn and Queens. Besides usual additions made to all the collections, new work done has been as follows:

1. Transferring systematic collections to occupy the southerly addition. Not completed, as the easterly side of the brook was planted to potatoes.
2. Continuing the border mound planting along Flatbush Avenue and in part along Washington Avenue.
3. Adding small "Moraine" and additional stepping stones to the Rock Garden.
4. Replanting dogwood trees on esplanade, and binding the trunks with canvas.
5. Replanting Local Flora shrubbery, and using extra plants on border mounds, in Lilac Collection, etc.

6. Making five new beds on and near the Wild Flower Path: planting over 1,500 plants of *Viola pedata* collected from Hempstead Plains.
7. Frozen clumps of the bearberry (*Arctostaphylos*) were brought in during January and planted near the Malbone Street gate, in specially prepared beds. These plants have, so far, shown every indication of doing well.
8. Planting privet hedge at service yard.
9. Occupied, for the first time, all of the new greenhouses, with some interruptions for repairs. As finally planned they are to be used as shown in the accompanying plan (Fig. 4).
10. Initial planting of the Iris garden.

Iris Garden

An Iris collection was started during the autumn, arranged upon the advice of Mr. Caparn, to continue from the northerly end of the willow collection to the lake, on both sides of the brook. Special beds and borders have been prepared for Japanese Iris, German Iris, Intermediate Iris, and other groups. There are now in the collection over 90 horticultural varieties and about 15 species. Some of these were already in our collections, some were purchased, and the following firms have contributed plants as indicated, sending 4 of each variety: Bobbink and Atkins, 20 varieties; Palisades Nurseries, 18 varieties; Mrs. Frances E. Cleveland, 12 varieties; Henry A. Dreer, 8 varieties; F. R. Pierson & Co., 6 varieties; Cottage Gardens Co., 6 varieties.

Among noteworthy gifts of living plants, in addition to those for the Iris Garden, were: 96 plants for greenhouses from Mr. Harold I. Pratt, Brooklyn; 42 for greenhouses from Miss Katherine Husted, Broadalbin, N. Y.; 3 each from Miss Ellen Eddy Shaw, Brooklyn; Mr. R. Le Boutillier, Philadelphia, and Mrs. S. W. Quick. Also from Isaac Hicks & Son 3 evergreens and 13 deciduous trees for the Rock Garden and vicinity. Gifts of one plant each were received from Mr. H. G. Rugg, Mr. H. B. Pratt, and Mr. Alfred T. White.

Fifty-eight plants for the rock garden from Mr. Clarence Lown, Poughkeepsie, and 20 rock garden plants from Mrs. Louis Stuyvesant Chandler, Tuxedo, N. Y. were also received as gifts.

Labeling and other Clerical Work

During the year 673 show labels were added to the collections. All of these represent verification of plants labelled for the first time, and there has been a good deal of replacement work. The collections are now better labelled than ever before, and consequently of more use to classes and the public generally. Accession numbers 7256–7913 were assigned during the year. Additions to the systematic collections were made as follows: By collection 20, by exchange 142, by gift 126, by purchase 261, derived from seed, 102; total, 651.

There have been in addition many other plants added to our existing collections to which no numbers were assigned, and which therefore do not show in the above tabulation.

Phanerogamic Herbarium

The additions to this collection came largely by purchase, the more important under this category being 744 from Michigan, 805 from China, and 350 from Washington State. Six hundred specimens were received in exchange from the U. S. National Herbarium, and Dr. J. Arthur Harris, Cold Spring Harbor, Long Island, presented 240. Total additions for the year were 2,747, and 2,041 of these and previous receipts were mounted and put in the cases.

At the time of moving into the building we doubled the capacity of our herbarium cases, so that, after spreading out the previously badly congested collections, we have, for the first time, adequate space for our present collection, and some space in each case has been reserved for future growth. The placing in the herbarium room of a selected list of books, such as all the Colonial Floras, *Kew Index,* Bentham and Hooker's *Genera Plantarum,* Bailey's *Cyclopedia,* and other reference works, has increased the convenience of the herbarium as a study collection. There is still a good deal of work needed to put it in such a condition as to make it of largest scientific significance.

All of the work of accessioning, keeping the records, and custodianship of the Herbarium has been in charge of the assistant

curator, Dr. Gundersen, who has also given considerable time to class work.

Personal Activities

My work on the Flora of Long Island has gone on steadily, and the original plan of a single volume on the flora and vegetation of the Island should, I think, be modified in the following way. To get anything like a complete list of the species of the Island will still take considerable time, and actual publication would have to be deferred until one was somewhere near to that ideal. On the other hand, a description of the vegetation, with ecological and phytogeographical data, is in such a state of completion that is could be prepared for publication within the coming year or early in 1919. I would therefore suggest that a volume of the Garden *Memoirs* could be brought out to publish these results, deferring until later a volume on the flora of the island.

Identification of specimens and answering correspondence about plants, and related matters, have taken more time than ever before, and in addition to editing *Torreya,* I have taken over the editorship of the *Journal of the International Garden Club.*

Respectfully submitted,

NORMAN TAYLOR,
Curator of Plants.

REPORT OF THE CURATOR OF PUBLIC INSTRUCTION FOR 1917

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as curator of public instruction for the year ending December 31, 1917.

Courses of Instruction

The regular courses of instruction offered at the Garden are grouped, as heretofore, into four classes, as follows:

A. Children's Gardens and Nature Study, including seven courses for children and four for teachers.

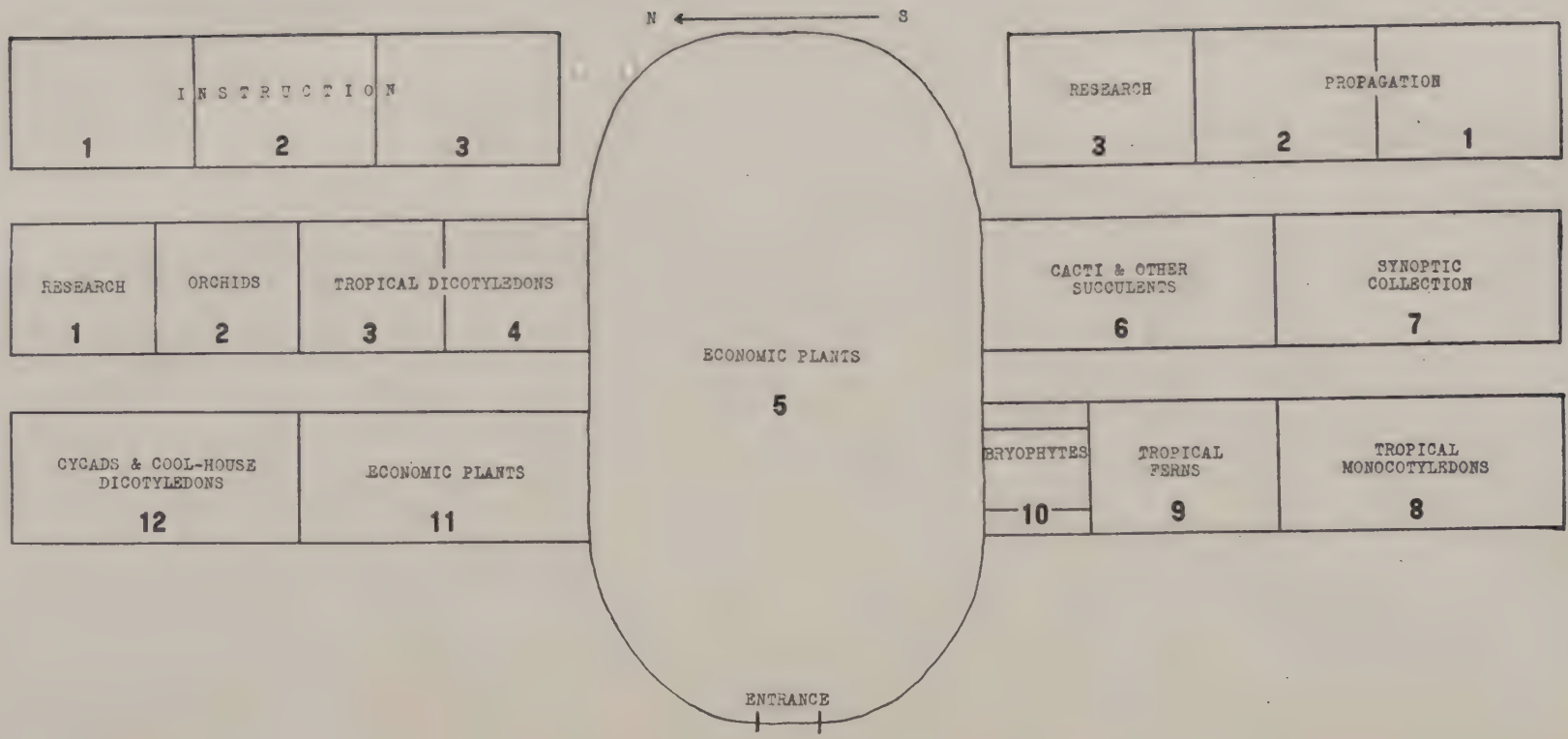

FIG. 4. Plan of the Plant Houses.

B. Courses for Teachers of Children's Gardening. This consists of eleven courses, extending over a full year; or it may be taken as a concentrated five-week's summer course.

C. Courses for the General Public, consisting of nine courses treating largely of gardening and other applied phases of the study of plants.

D. Advanced Courses and Investigation, embracing nine courses, adapted for students of college or graduate rank.

The registration for the full year in all the various courses offered, mostly in group *A,* totals 4,083, with a total attendance of 26,794. Adding to this the numbers in attendance at school classes which came to the Garden for instruction, as well as those in attendance at lectures and addresses given by various members of the staff, both at the Garden and at schools, clubs, etc., the total number of people directly reached by our educational work during 1917 was over 65,000. Over half a million people visited the Garden, as recorded at the gates, during the year.

The following table shows the attendance by months and the annual totals:

TABLE I

ATTENDANCE DURING 1917

At the Garden	Jan.	Feb.	Mar.	Apr.	May	June	July
At regular classes	842	1,372	1,386	1,507	1,482	3,972	4,395
At visiting classes	480	250	180	580	1,769	2,767	390
At lectures to children				500	1,569	2,220	350
At lecture to adults				1,500	70	205	160
At conservatories	1,998	1,214	7,150	3,080	2,051	2,014	2,000
Registered at gates	24,669	24,057	20,306	50,694	68,820	52,192	62,382
At addresses at schools, clubs, etc.	560	800	3,715	13,000	6,350	2,560	20

At the Garden	Aug.	Sept.	Oct.	Nov.	Dec.	Annual Totals
At regular classes	3,300	3,855	2,870	1,001	812	26,794
At visiting classes		417	4,438	1,213	45	12,024
At lectures to children		407	4,338	1,213	45	10,642
At lectures to adults			30	30		1,995
At conservatories	2,000	1,404	1,981	3,255	1,181	29,328
Registered at gates	54,991	57,200	35,000	36,928	22,046	509,285
At addresses at schools, clubs, etc.		35	575	50	50	27,715

The emphasis of most of our teaching thus far on the practical and applied side of plant study was made especially prominent

this year on account of the food situation which developed after war was declared. Some of this special war garden service done by the Garden and its staff is recorded in the Brooklyn Botanic Garden Record 6: 152–154. 1917. The report of the curator of elementary instruction, appended below, gives further details of certain phases of this war garden work.

In that phase of our work done by Mr. Stoll in which various phases of nature study, such as tree study, etc., are taught to groups of Boy Scouts, Camp Fire Girls, and other similar organizations, he has instructed during the year 1,124 individuals, mostly Scouts and members of summer camps. A certificate was issued to each of those who satisfactorily completed certain prescribed work extending over at least six weeks. A notebook and test were required in each case. It indicates their sustained interest and persistence to find that 70 of them passed the requirements and took these certificates, 55 of whom worked at least six weeks, 10 at least twelve weeks, and 5, eighteen weeks.

Cooperation with Local Schools

Talks at Schools.—Our records show 82 talks and lectures given at schools, mother's clubs, etc., largely upon methods and various phases of gardening. An attendance of over 27,000 was recorded at these gatherings.

School Classes at the Garden.—One hundred and forty-nine of these classes, consisting in the aggregate of over 10,000 pupils, mostly from the elementary schools of Brooklyn, visited the Garden for instruction in various subjects which were especially chosen to correlate closely with nature study and geography as given in the schools. This important work is more and more appreciated by teachers, as it brings the pupil in close contact with the living economic plants which he has studied about, but has likely never seen, thus being an approach, at least, to the laboratory method of teaching these subjects. Miss Shaw's report explains several phases of this cooperation with schools in considerable detail.

Study and Loan Material.—Seedlings, fern prothallia, algae, and other plant material have been furnished from time to time

to various schools, including Erasmus Hall, Bushwick, and Girls' High Schools, and Columbia University. Petri dishes, filled with nutrient agar, for the study of bacteria and molds, have been furnished on request to Girls', Boys', Manual Training, and Eastern District High Schools, as well as to the Teachers' Training School of Brooklyn.

Cryptogamic Herbarium

The following accessions were made to the cryptogamic herbarium during 1917:

Mosses and liverworts collected in Porto Rico, by gift from Prof. H. H. Whetzel, Cornell University	5
Mosses, by purchase	50
Algae, by purchase	100
Fungi, by purchase	425
Fungi, by gift from Mr. Carl A. Schwarze, assistant plant pathologist of New Jersey	124
Fungi, by gift from Dr. C. Stuart Gager	1
Fungi, by bequest of Mr. Frank H. Ames	517
Fungi, by exchange with Prof. E. W. D. Holway, of the University of Minnesota	50
Fungi, by exchange with Prof. John A. Stevenson, Pathologist, Insular Experiment Station, Rio Piedras, Porto Rico	110
Total	1,382

Editorial and Research Work

Series V of the *Leaflets*, consisting of fourteen numbers, was utilized as far as our slender resources would permit in the war service educational work of the Garden, the following subjects in particular aiding toward the solution of local garden and food problems: *The small vegetable garden; Some insect pests; The storage of vegetables; The one-period cold-pack method of canning; Fall treatment of land for garden crops.* These were issued in extra large editions, which were soon exhausted.

The assistant curator of elementary instruction, Miss Shaw, was editor of the *National Plant, Flower, and Fruit Guild Magazine* during the year.

Besides editing *Leaflets*, I have also acted as one of the edi-

torial committee in charge of the *American Journal of Botany*, and of the *Memoir* volume of scientific papers delivered at the Dedication exercises of the Garden.

As reported in the RECORD for October, 1917, I spent some weeks in Texas for the United States Department of Agriculture, studying a sudden outbreak of rust disease on cotton. This problem, as well as other problems of plant disease, have continued to occupy my research time during the year.

Respectfully submitted,

EDGAR W. OLIVE,
Curator of Public Instruction.

Report on Elementary Instruction, 1917

BY ELLEN EDDY SHAW

The general procedure of the work in the Department of Elementary Instruction was influenced this year by war conditions. It might perhaps be well to summarize this war work, at the same time keeping in mind that our regular activities continued as usual.

During the spring, eighty-two lectures were given outside of the Botanic Garden by members of the staff, with an attendance of 27,715. The majority of these lectures were about small vegetable gardens. At five of the public school centers evening talks were also given on this same subject.

A group of fifty women constituting "The Flatbush Garden League" received regular instruction in gardening and had a demonstration plot ten by twenty feet. A group of twenty from the Woman Suffrage Headquarters and also another group called "The Davenport Class" made up of fifteen women, received the same instruction as the Flatbush Garden League.

The Curator of Elementary Instruction was called upon to take a class of sixty at Teachers' College in their extension department, giving five lessons and demonstrations on out-door garden work. In addition, during Teachers College "War week," a course of five lessons was given to a class of one hundred regular students. Similar work was given to a Garden

Club at Dobb's Ferry, and a model garden was laid out under our supervision on Staten Island. Ten public schools asked for consultations on war gardens. Two canning demonstrations were given at the Garden. All the above work was in addition to our regular instruction, in response to special requests, because of war conditions.

The attendance of children in our regular classes was over 26,000 for the year; a larger attendance than we have ever had before. 120,755 penny packets of seed were put up and sold, an appreciable increase over 25,000 packets put up in 1914, our first year of this work. During the spring and fall, 153 classes came from our public schools to receive special work at the Garden. The number of children attending these classes was 12,024. Owing to the fact that our schedule was already full, we were unable to care for over 2,000 school children who applied for lectures during the month of October.

The summer school for the training of women in garden work is an outgrowth from our regular teachers' course extending throughout the year. From these two courses, twenty-two young women received certificates this last December. A part of their training is practice in outdoor garden work with children. This might properly be entirely covered in our own children's gardens; but we believe that a wider experience comes from working in outside gardens as well, so this year three school gardens were carried on under the supervision of our students, at Public Schools Nos. 89, 22, and 24. One hundred and fifty home gardens were also visited by the women of the training class.

Our own garden work was heavier this year than ever before. In each of the 390 plots which were cultivated, we made a special point of raising such crops as would be of the greatest help in the general shortage of food, and at the same time give the students practice in the growing of these crops. On two successive days when careful records were kept, $173.52 worth of vegetables were taken out of the 290 children's plots, each eight by ten feet. This was not an unusual amount. Another feature in our gardening this summer was the opportunity given to twenty-two high-school boys each to cultivate plots twenty by forty feet. These boys

made a special point of raising such war crops as potatoes and beans. The best showing in potatoes was from a lad who raised ninety pounds of potatoes from seven and one half pounds of seed.

One might almost expect that at the end of the season, or in the fall, we would have completed our garden work, and yet some of our fall courses were far larger than ever before, due to the greater interest people were taking in the subject. Three high schools, Bushwick, Girls, and Erasmus Hall, requested special classes in school time, or in after-school time, as a part of their regular class work. I might state here that the figure 67,734 represents the attendance at all of our activities in this department including attendance at regular classes, visiting classes, lectures to adults, and addresses to schools and clubs.

In order to increase our usefulness to the schools and the public at large, I would make these suggestions for the future. First, the purchase of a motion-picture machine. This would make it possible to instruct much larger groups of children, and in ways and subjects not now possible. By means of the motion-picture machine five hundred children might readily be instructed at one time.

Second, late afternoon talks at the Garden for school classes. We have found, during this spring, that it is almost impossible for many "Gary" schools to avail themselves of the privileges of the Garden because no teacher can leave with a class, since she and her class are tied up with so many others at the school. In the other type of school, where a teacher stays with her class most of the session, it can easily be arranged for such a class to come to the Garden for a half day without interfering with the rest of the school.

Third, the establishment of Botanic Garden centers throughout Brooklyn. These should be where the distances are too great for the children to come to the Garden, and should be located, if possible, in schools where a number of other schools are close by.

Fourth, the purchase of a light automobile, to carry specimens to schools and to assist in home-garden visiting.

Fifth, the establishment at schools, under Garden supervision,

of "Nature Rooms," in which terraria, aquaria, Wardian cases, etc., could display in an attractive manner, plants and other nature material.

REPORT OF THE LIBRARIAN FOR 1917

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith the following report for the year ending December 31, 1917.

The moving of the library from a crowded temporary room to its permanent quarters in the new wing of the laboratory building is the outstanding fact in the history of the library for the past year.

Accessions

It is a pleasure to report that the year 1917 has shown a steady growth. Among the valuable accessions presented to us may be mentioned 5,833 publications received from the Florida agricultural experiment station, including annual reports, bulletins, etc., of the various agricultural experiment stations in the United States; 91 books and 235 parts of publications from Mr. Leonard Barron; 42 volumes, 18 pamphlets, and 58 parts bequeathed to us by Mr. Frank H. Ames. Among items of special interest are the "Musaeum Tradescantianum," published in 1656, as well as seven autograph letters written by François André Michaux, 1817–1827, presented by Mr. Alfred T. White; and "The American Gardener," by John Gardiner and David Hepburn, 1804, given by Mr. W. A. White. The complete list of donors is given below.

The accessions secured by purchase include, among other items, Flore des Serres et des Jardines de l'Europe; Lowe, Ferns, British, and Exotic; Grevillea; Revista di Patologia Vegetale; and Chemical Abstracts.

The total number of volumes and pamphlets on December 31, 1917, was 12,066, as compared with 11,193, on December 31, 1916—an increase of 873 for the year.

Binding

About four hundred volumes, mainly periodicals, were sent to the binder. An equal number of volumes can be taken off the shelves for binding just as soon as funds become available.

It would be of great advantage to have funds available for binding some time during the spring, so that books for the binder could be prepared and sent away just before vacations, when they would be least needed. This would also enable the librarian to systematize her work to much better advantage, instead of having this added work at a time when new accessions and reports require so much attention.

Periodicals

Forty-eight new periodicals have been added, mainly through exchange, making the total number of periodicals received 306. All foreign periodicals have been received regularly except those printed in German.

State Publications

The increase in the number of periodicals received at the Garden is partly due to the fact that the following agricultural experiment stations were added to our exchange list during 1917: Tuskegee, Alabama; Colorado; Santiago de las Vegas, Cuba; Georgia; Hawaii Sugar Planters' Station, Honolulu; Rio Piedras, Porto Rico; Texas; Virginia, Truck Experiment Station; and the Western Washington Experiment Station.

The library now receives each month from the U. S. Department of Agriculture, States Relation Service, a "List of station publications received by the office of experiment stations." By means of this list we are enabled, each month, to check the publications issued by the experiment stations with those received by us directly from them, and in this way to follow up the missing numbers.

Library Assistants

During part of the year Miss Tikiob assisted regularly for one hour a day. In addition to her stenographic work she has helped typewrite the shelf list and pamphlet cards. This work has since

been taken over by Miss Meyer. Mrs. Burdick has given two hours a day, typewriting cards for the dictionary catalog, the serial shelf list, caring for periodicals, making shelf labels, and preparing new books.

Loans

Through the courtesy of the Library of Congress, Yale University, and the American Museum of Natural History we were enabled to borrow books for the Garden staff.

Books from our collection were forwarded as usual to the Biological Laboratory at Cold Spring Harbor for its summer session. Some volumes were also loaned to the Brooklyn Museum library, as well as to some of the members of the Museum staff.

Summary

Aside from the preparation of new accessions and the regular routine duties, the following pieces of work were completed during 1917:

The folio volumes of the book collection, 201 in number, and the 74 volumes of the Hyde gift were cataloged and prepared for the shelves.

About 200 volumes, chiefly on systematic botany, were moved into the herbarium. This collection was embossed with the Brooklyn Botanic Garden stamp, and book plates were inserted. These books were checked with the shelf list and catalog, and in this way a number of inaccuracies were rectified.

The cataloging of serials was begun, as well as a shelf list. We hope to make the serial shelf list one of the principal pieces of work for 1918.

The catalog of duplicates has been begun and the cataloged duplicates arranged.

A vertical file has been arranged of autographs, mss., photographs, and portraits.

The trade catalogs have been arranged in a vertical file for ready reference.

College announcements and catalogs have been arranged in a special section.

Printed lists of the Bulletins and Farmers' Bulletins of the U. S. Department of Agriculture were checked with such of these publications as we have here, and a request made for the missing numbers. This helped to fill in many of our gaps.

The Garden Library has been placed on the free mailing list of the Smithsonian Institution to receive separates on botany, bacteriology, biology, chemistry, exploration, sanitation, and insects. In this manner, we received forty-three publications.

The entire pamphlet collection, numbering over 7,000, and alphabetically arranged by author, was revised and author guides were freely inserted in order to facilitate finding them. It is hoped that some time in the near future this entire collection may be arranged according to subject, as is done at the American Museum of Natural History, but until this goal may be attained it was thought best, by the present arrangement, to make the pamphlets as easy of access as possible.

2,062 agricultural experiment station cards have been arranged according to the "Key to subject index of experiment station literature," issued by the U. S. Department of Agriculture, office of experiment stations. Previously our experiment station cards were grouped roughly according to classes.

The Brooklyn Botanic Garden, during 1917, was represented at the Atlantic City meeting of the Pennsylvania Library Club and the N. J. Library Association, at the meetings of the New York Library Club, and the New York Special Libraries.

1918

With the aid of a full-time assistant we shall hope to complete the greater portion of the serial shelf list and catalog (one of the most necessary tasks to be accomplished here), to fill up the gaps in our sets of periodicals, to complete our catalog of duplicates which entails a comparison of each unverified duplicate with the shelf list and catalog, and to prepare for the shelves the Florida Agricultural Experiment Station gift of 5,833 parts.

I wish to extend to each member of the Garden staff my appreciation of the aid given to me during the past year.

The statistical report and the list of donors follows.

Statistical Report on the Library

Accessions during 1917

	Volumes	Pamphlets	Parts (including Periodicals)
By Exchange	31	30	2,570
By Gift	198	401	8,044
By Publication	0	37	216
By Purchase	167	7	350
By Transfer	2	0	3
By Deposit	0	0	13
	398	475	11,196

Total number of parts added to library in 1917, including current periodicals 11,196

Total number of volumes in library December 31, 1916..... 4,371
Total number of volumes added in 1917..... 398
Total number of volumes in library December 31, 1917..... 4,769

Total number of pamphlets in library December 31, 1916..... 6,822
Total number of pamphlets added in 1917..... 475
Total number of pamphlets in library December 31, 1917..... 7,297

Total number of volumes and pamphlets December 31, 1917..... 12,066
Total number of volumes and pamphlets December 31, 1916..... 11,193
Increase in number of volumes and pamphlets..... 873

Serial Publications

Count of periodicals, state and government documents, and society transactions currently received during 1917:

By Subscription	21
By Gift	38
By Exchange	240
By Transfer from Brooklyn Museum	1
By Deposit from Brooklyn Public Library	2
By Publication	4
Total	306
Increase during 1917	48

Miscellaneous Statistics for 1917

Index cards of the U. S. experiment stations on file in the library, December 31, 1916 6,402
Experiment stations index cards added by purchase in 1917..... 268
Total number of experiment stations index cards on file in the library, December 31, 1917 6,670

Torrey Botanical Club index cards on file in the library, December 31, 1916	24,179
Torrey Botanical Club index cards added by purchase during 1917	1,185
Total number of Torrey Botanical Club index cards on file December 31, 1917	25,364
Index Algarum Universalis cards, December 31, 1917	5,796
Added by purchase	2,285
Total, Index Algarum Universalis cards, December 31, 1917	8,081
Cards added to self list	623
Cards for serial shelf list	293
Cards added to dictionary catalog	1,514
Cards added to pamphlet catalog	351
Cards added to current periodical catalog	198
Cards for catalogue of duplicates	450
Typewritten cards, total	3,429
Books loaned to members of staff	412
Books loaned to other institutions	18
Books borrowed from other institutions	4
Volumes entered in accession book	399
Number of readers in library, approximately	1,290
Number of letters written	464
Photographic negatives on file December 31, 1916	2,075
Negatives accessioned during 1917	549
Total number of negatives on file December 31, 1917	2,624
Lantern slides on file December 31, 1916	1,669
Lantern slides accessioned during 1917	253
Total number of lantern slides on file December 31, 1917	1,922

Donations, 1917

Books: American Scenic and Historic Preservation Society, New York, 2; Ames, F. H., Brooklyn, 42; Barron, Leonard, Brooklyn, 91; Brooklyn Museum, 1; Carnegie Foundation for the Advancement of Teaching, New York, 4; Clarke, J. M., Albany, 1; Farlow, W. G., Cambridge, Mass., 1; Florida State Geological Survey, 8; Free, Montague, Brooklyn, 1; Gager, C. S., Brooklyn, 13; Harvard University, Gray Herbarium, Cambridge, 1; Iowa Academy of Science, 1; John Crerar Library, Chicago, 1; Maine, Department of Agriculture, 1; Michigan, State Board

of Agriculture, 1; Miles, Benjamin, Brooklyn, 1; New York Agricultural Experiment Station, 1; New York State Library, 2; New York Zoological Society, 1; North Carolina Geological and Economic Survey, 2; Ohio Geological Survey, 1; Olive, E. W., Brooklyn, 1; Smithsonian Institution, Washington, 6; Texas Agricultural Experiment Station, 5; U. S. Brewers Association, New York, 1; U. S. D. A., Library, 1; U. S. Dept. of the Interior, Bureau of Education, 2; White, A. T., Brooklyn, 2; White, O. E., Brooklyn, 2; White, W. A., Brooklyn, 1.

Pamphlets: Ames, F. H., Brooklyn, 18; Brooks, S. C., Cambridge, Mass., 3; Canadian Forestry Association, Ottawa, 2; Carnegie Institution of Washington, 1; Chamberlain, H. B., Chicago, 1; College of the City of New York, 1; Columbia University, Barnard College, 1; Committee on Public Information, Washington, 3; Elliott, J. A., Urbana, Ill., 1; Farwell, O. A., Detroit, 1; Fenn, W. O., Cambridge, Mass., 2; Fink, Bruce, Oxford, Ohio, 1; Florida State Geological Survey, 5; Gager, C. S., Brooklyn, 77; Gleason, H. A., Ann Arbor, Mich., 1; Gleich, Dr. Morris, Brooklyn, 12; Grossenbacher, J. G., Geneva, N. Y., 1; Haas, A. R., Cambridge, Mass., 5; Harper, R. M., College Point, N. Y., 2; Harshberger, J. W., W. Philadelphia, 5; Hooker, H. D., Jr., New Haven, 2; University of Illinois, College of Agriculture, Urbana, 1; John Crerar Library, Chicago, 1; Livingston, B. E., Baltimore, 1; Long Island Historical Society, Brooklyn, 4; Miles, Benjamin, Brooklyn, 4; New York State College of Agriculture, Ithaca, 14; Olive, E. W., Brooklyn, 4; Osterhout, W. J. V., Cambridge, Mass., 5; Pease, A. S., Urbana, Ill., 1; Reed, G. B., Cambridge, Mass., 5; Smith, Mrs. A. M., Brooklyn, 13; Smith, E. F., Washington, 61; Smithsonian Institution, Washington, 69; Taylor, Norman, Brooklyn, 50; U. S. Dept. of Agriculture, Washington, 2; U. S. D. A., Bur. of Plant Industry, 1; U. S. D. A., Division of Publications, 8; U. S. D. A., Library, 1; U. S. Dept. of Commerce, Bureau of Standards, 1; U. S. Dept. of Commerce & Labor, 2; Van Tubergen, C. G., Haarlem, Holland, 1; Yale University, Osborn Botanical Laboratory, New Haven, 7.

Respectfully submitted,

RAY SIMPSON,
Librarian.

FINANCIAL STATEMENTS FOR 1917

1. Municipal Account

1360	*Personal Service:*		
	Appropriation		$32,760.00
	Contributed from private funds		7,940.77
			40,700.77
	Expended		40,700.77
1361	*Supplies:*		
	Appropriation		$ 3,439.00
	Contributed from private funds		133.14
	Transferred from 3016—interest on bonds, etc.		3,107.94
	Transferred from 1366	$ 43.02	
	Transferred from 1368	60.51	
	Transferred from 1369	3.64	107.17
			6,787.25
	Transferred to 1364	110.59	
	Expended	6,676.66	6,787.25
1362	*Equipment:*		
	Appropriation		$ 1,304.00
	Contributed from private funds		198.41
	Transferred from 1369		10.63
			1,513.04
	Expended		1,513.04
1363	*Materials:*		
	Appropriation		$ 420.00
	Transferred to 1365		44.11
			375.89
	Expended		375.89
1364	*Repairs and Replacements:*		
	Appropriation		$ 368.00
	Contributed from private funds		191.81
	Transferred from 1361		110.59
			670.40
	Expended		670.40
1365	*Light, Heat and Power:*		
	Appropriation		$ 100.00
	Contributed from private funds		47.37
	Transferred from 1363	$44.11	
	Transferred from 1366	.35	
	Transferred from 1369	1.97	46.43
			193.80
	Expended		193.80

1366 *Transportation:*			
Appropriation			$ 820.00
Transferred to 1361		$43.02	
Transferred to 1365		.35	43.37
			776.63
Expended			738.74
Balance, December 31, 1917			$ 37.89
1368 *Telephone Service:*			
Appropriation			$ 150.00
Transferred to 1361			60.51
			89.49
Expended			89.49
1369 *General Plant Service:*			
Appropriation			$ 490.00
Transferred to 1361		$ 3.64	
Transferred to 1362		10.63	
Transferred to 1365		1.97	16.24
			473.76
Expended			473.76
1370 *Contingencies:*			
Appropriation			$ 300.00
Contributed from private funds			53.12
			353.12
Disbursed			353.12
Summary of Municipal Accounts:			
Appropriation by city for maintenance			$40,151.00
Transferred from Code 3016			3,107.94
Contributed from private funds			8,564.62
			51,823.56
Expended			51,785.67
Balance, December 31, 1917			$ 37.89

2. Private Funds Accounts for 1917

1. *Endowment Fund, Income:*			
Deficit, January 1, 1917		$ 452.63	
Income, 1917			$ 3,895.00
Transferred from Collections (1917) Account			1,212.63
Contributed to maintenance account	3,385.00		5,107.63
Expended	1,270.00		5,107.63

2. *Botanic Garden Collections Account, 1917:*

Received, 1917		$10,876.00
Transferred from Collections (1916) Account, balance		.78
Transferred from Special Contributions—Japanese Garden Account, balance		1.25
		10,878.03
Transferred to Special Contributions	$8,142.81	
Transferred to Endowment Fund, Income	1,212.63	
Expended	1,204.41	
Outstanding	318.18	10,878.03

3. *Special Contributions:*

Transferred from Collections (1917) Account		$ 8,142.81
Received from sale of potatoes		34.64
		8,177.45
Contributed to maintenance account	$5,083.47	
Expended	3,093.98	8,177.45

4. *Cary Library Fund, Income:*

Balance, January 1, 1917		$ 62.13
Income, 1917		100.00
		162.13
Expended		159.77
Balance, December 31, 1917		$ 2.36

5. *George C. Brackett Library Fund, Income:*

Balance, January 1, 1917		$ 36.91
Income, 1917		25.00
		61.91
Expended		33.56
Balance, December 31, 1917		$ 28.35

6. *Sustaining Membership:*

Balance, January 1, 1917		$ 2.01
Received, 1917		309.23
		311.24
Expended		205.66
Balance, December 31, 1917		$ 105.58

7. *Annual Membership:*

Balance, January 1, 1917		$ 1.13
Received, 1917		880.00
		881.13
Expended		500.16
Balance, December 31, 1917		$ 380.97

8. *Special Contribution—Japanese Garden:*

Balance, January 1, 1917		$ 1.25
Transferred to Collections (1917) Account		1.25

9. *Tuition and Sales:*

Balance, January 1, 1917		$ 251.68
Received, 1917:		
(a) Instruction	$ 620.59	
(b) Penny seed-packets	1,207.55	
(c) Incidentals	261.90	2,090.04
		2,341.72
Contributed to maintenance account	$ 96.15	
Expended:		
(a) Instruction	945.35	
(b) Penny seed-packets	455.07	
(c) Incidentals	21.18	1,517.75
Balance, December 31, 1917		$ 823.97

Summary of Private Funds Accounts:

Deficit, January 1, 1917	$ 97.52	
Income, 1917		$18,210.69
Contributed to maintenance account	8,564.62	
Expended	8,207.32	16,869.46
Balance, December 31, 1917		$ 1,341.23

APPROPRIATIONS OF CORPORATE STOCK OF THE CITY OF NEW YORK FOR PERMANENT IMPROVEMENTS, AND EXPENDITURES THEREFROM DURING 1917

C.D.P. 200-J. (*$40,000.00*) *For Grading, Draining, Piping, and Soil Improvement*

Balance, January 1, 1917	$ 60.15
Expenditures:	
Thomas Horan & Sons, 80 cubic yards manure @ 75c. ..	60.00
Balance, December 31, 1917	$ .15

C.D.P. 200-M. (*$100,000.00*) *For Improvement of the Brooklyn Botanic Garden*

Balance, January 1, 1917	$ 9,709.36
Expenditures	8,287.23
Balance, December 31, 1917	$ 1,422.13

S.-566. (*$100,000.00*) *Suspense Account, Contributions for Brooklyn Botanic Garden Improvement Fund*

Balance, January 1, 1917	$10,096.72
Expenditures	8,250.78
Balance, December 31, 1917	$ 1,845.94

APPENDIX I

PUBLICATIONS OF MEMBERS OF STAFF AND REGISTERED INVESTIGATORS DURING 1917

Cross, Jean A.

—— Fourth annual garden exhibit for Brooklyn boys and girls. *Brooklyn Bot. Gard. Leaflets* **V**[5]. May 2.

Free, Montague

—— The alpine house as a feature. *Gardeners' and Florists' Annual* 1917: 71–74.

—— Alpines for early bloom. *Garden Magazine* Mar. 1917: 84.

—— Flowers of winter. Pocket Garden Library pp. 226. Garden City, Doubleday Page & Co. May.

—— The small vegetable garden. *Brooklyn Bot. Gard. Leaflets* **V**[3]. Apr. 25th.

—— Some insect pests. *Ibid.* **V**[6]. May 16th.

—— The storage of vegetables. *Ibid.* **V**[8]. June 13th.

—— Fall treatment of land for garden crops. *Ibid.* **V**[11]. Oct. 3d.

—— The Pruning Manual. (Review.) *Jour. Internat. Garden Club* 1: 553–554. Dec.

—— Garden Farming. (Review.) *Jour. Internat. Garden Club* 1: 549–551. Dec.

PUBLICATIONS 1917

Gager, C. Stuart

—— Atkins, Recent Researches in Plant Physiology. (Review.) *Torreya* 17: 27–28. February.

—— Guide to the laboratory building. *Brooklyn Bot. Gard. Leaflets* **V**[3]. April 18.

—— Sixth Annual Report of Brooklyn Botanic Garden. *Brooklyn Bot. Gard. Record* 6: 27–46. April.

—— Ideals and opportunities for a botanic garden. *Brooklyn Bot. Gard. Record* 6: 121–130. July.

—— The Brooklyn Botanic Garden. *Jour. Internat. Garden Club* 1: 119–132. August.

—— The Brooklyn Botanic Garden. *Sci. Mo.* **5**: 381–383. Oct. 1917.

—— How can I help the Brooklyn Botanic Garden, and Plan of further development. *Brooklyn Bot. Gard. Record* **6**: 145–152. Oct.

—— War garden service of the Botanic Garden. *Brooklyn Bot. Gard. Record* **6**: 152–154. Oct.

—— Forest problems of the Ashokan watershed. *Brooklyn Bot. Gard. Leaflets* **V**[12–13]. October 10.

Gundersen, Alfred

—— The wild flower garden in June. *Brooklyn Bot. Gard. Leaflets* **V**[7]. May 31.

Olive, Edgar W.

—— Endophyllum-like rusts of Porto Rico. *Amer. Journ. Bot.* **4**: 44–52. Ja.

—— Report of the Curator of Public Instruction. *Brooklyn Bot. Garden Record* **6**: 56–69. Ap.

—— The one-period cold-pack method of canning. *Brooklyn Bot. Garden Leaflets* **V**[9]. June 27.

—— A trip to Texas to investigate cotton-rust. *Brooklyn Bot. Garden Record* **6**: 154–158. Oct.

—— Autumn colors. *Brooklyn Bot. Gard. Leaflets* **V**[14]. Oct. 17.

Shaw, Ellen Eddy

—— List of talks for elementary school classes. *Brooklyn Bot. Gard. Leaflets* **V**[2]. April 11.

—— The pocket garden library: Garden flowers of spring. Garden flowers of summer. Garden flowers of autumn. Doubleday, Page & Co. May.

—— Talks for elementary schools. *Brooklyn Botanic Garden Leaflets* **V**[10]. Sept. 12.

Taylor, N.

—— Report of the Curator of Plants for 1916. *Brooklyn Bot. Gard. Record* **6**: 47–56. April.

—— Report of the British Columbia Botanical Office. (Review.) *Torreya* **17**: 86. May.

—— Flora of the Vicinity of New York. *Scientific Monthly* **4**: 548–553. June.

—— Plants Now in Bloom. *Brooklyn Botanic Garden Leaflets* 5^{8}. June 13.

—— Informal and Wild Gardening. *Jour. Internat. Garden Club* **1**: 91–104. August.

—— Bog Gardening with Native Plants. *The Garden Mag.* **26**: 89–91. October.

—— Plants of the Catskill Aqueduct Region. *Brooklyn Bot. Gard. Leaflets* 5^{12-13}. October 10.

White, Orland E.

—— Inheritance of endosperm color in maize. *Am. Journ. Bot.* **4**: 396–406. July.

—— Inheritance studies in Pisum—IV: Interrelation of the genetic factors of *Pisum*. *Jour. Agr. Research* **11**: 167–190. October.

—— Inheritance studies in Pisum—II: The present state of knowledge of heredity and variation in peas. *Proceed. Am. Philosophical Soc.* [*Philadelphia*] **56**: 487–588. December.

APPENDIX 2

PUBLIC LECTURES, ADDRESSES, AND PAPERS GIVEN BY MEMBERS OF STAFF DURING 1917

By the director of the Garden:

March 10. *War garden work of the Brooklyn Botanic Garden.* Before National Educators Conservation Society. New York.

April 19. *Ideals and opportunities for a botanic garden.* Brooklyn Botanic Garden Dedication Exercises.

April 30. *Vacant lot gardening and the food situation.* Erasmus Hall High School, Brooklyn. Before two assemblies.

May 5. *The aims and objects of the Brooklyn Botanic Garden.* Before the Botanical Society of Pennsylvania, Philadelphia.

December 14. *What the Botanic Garden is doing and planning for the schools and the city.* New York Association of Biology Teachers. Washington Irving High School, N. Y. City.

December 29. *The near future of botany in America.* Ad-

dress of retiring Vice President and Chairman of Section G (Botany), of the Am. Assoc. Adv. Sci., Pittsburgh.

By the curator of plants:

January 23. *Cultivation of woodland plants.* International Garden Club, New York.

March 21. *Haiti and Santo Domingo.* For Women's Auxiliary, board of foreign missions, St. Thomas's Parish House, New York.

August 1. *Cultivation of woodland plants.* Newport Garden Club.

October 19. *The vegetation of Montauk, Long Island.* Torrey Botanical Club Semi-Centennial exercises.

By the curator of public instruction:

January 31. *Some cytological features of Porto Rican Endophyllums.* Before the Torrey Botanical Club, at the New York Botanical Garden.

February 19. *Forestry as a life-work.* Before the Science Club, Boy's High School, Brooklyn.

April 17. *Bacteria, yeasts and molds.* Before the general assembly, Boy's High School, Brooklyn. (2 lectures.)

April 26. *Vacant lot gardening.* Public lectures for the department of education, New York City, at P. S. No. 137, Canarsie.

April 27. *Vacant lot gardening,* at P. S. No. 40. Queens.

October 18. *A cotton-rust epidemic in Texas.* Before the Torrey Botanical Club, 50th Anniversary celebration, at Columbia University.

October 30. *Botanical experiences of the summer.* Before the department of botany, Brooklyn Institute.

By the curator of plant breeding:

April 20. *Inheritance studies on castor beans.* Dedication Exercises, Brooklyn Botanic Garden.

October 5. *Inheritance studies in Pisum—II: The present state of knowledge of heredity and variation in peas.* (By title.) American Philosophical Society, Philadelphia.

October 19. *Inheritance of height in peas.* Semi-centennial exercises, Torrey Botanical Club.

By the librarian:

May 15. *Problems in a botanical library.* Before the senior class of the New York Public Library School, Manhattan.

By the assistant curator of the herbarium:

Feb. 8. *Botany in summer camps.* Camp Directors Association, Columbia University.

May 5. *Spring wild flowers.* Garden Club, Salisbury, Conn.

May 11. *Spring wild flowers.* Garden Teachers' Association, Brooklyn Botanic Garden.

Dec. 1. *Plant classification from Theophrastus to Hofmeister.* Department of Botany, Brooklyn Institute of Arts and Sciences.

By the assistant curator of elementary instruction:

Feb. 19. *Window boxes and back yard gardens.* Hebrew Educational Society—Brooklyn.

April 16. Garden talks at Public School lecture centers, on *Home Gardens.* Public School No. 146.

April 17. Ditto. Public School No. 81.

April 27. Ditto. Public School No. 40, Queens.

Nov. 23. *Bulb planting.* Flatbush Garden League. At the Botanic Garden.

Dec. 11. *What the Brooklyn Botanic Garden is doing for the children of Brooklyn.* Torrey Botanical Club. American Museum of Natural History.

By the head gardener:

Mar. 9. *Alpine and rock plants.* Garden Teachers' Association, Brooklyn Botanic Garden.

April 29. *Rock and alpine gardens.* International Garden Club, New York.

May 25. *Insect and fungous pests.* Teachers College Extension Department.

May 31. *Insect and fungous pests.* Dobbs Ferry Garden Club.

July 13. *Insect pests.* Flatbush Garden League, Brooklyn Botanic Garden.

Nov. 9. *Winter work in the garden.* Flatbush Garden League, Brooklyn Botanic Garden.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL VII July, 1918 No. 3

EFFECTS OF THE SEVERE WINTER ON THE WOODY PLANTS IN THE GARDEN

Since weather records have been kept, there has been no such severe winter as the one just past. During the Christmas holidays, and just after, minimum temperatures were recorded of —13° at the Weather Bureau (414 ft. in the air), —10° at the New York Botanical Garden, —7° at the Central Park Weather Bureau station, which is nearly at ground level, and —8° at the Brooklyn Botanic Garden where the thermometer is in a somewhat sheltered place. The first four days of the year showed minimum temperatures of —5°, +2°, 0°, and —3° respectively, and on January 12 the temperature was 50. Worst of all, on the latter day, the velocity of the wind was greater here than in any other place in the country, the record showing maximum velocity of 84 miles an hour, from the southeast. The following of such extreme cold by a warm wind of this great velocity apparently played havoc with many valuable plants in the Garden. With the ground frozen to depths unknown before, as there was practically no snow covering during the coldest days, the root activity of most plants would be stopped, while the warm wind on the 12th, when the maximum temperature for January was recorded, would dry out many evergreens, even if they had withstood the cold of a few days before. Because of this combination of cold

temperatures followed by warm wind, it is perhaps impossible to ascribe all our losses to cold alone. Certainly one or the other, or most probably their combination, has had disastrous results, as the following notes will show.

Shrubs and Trees Killed Outright

Pinus rigida (young specimen)
Juniperus oblonga
Picea alba
Alcockiana
Abies dumosa
Abies concolor (young specimen)
Chamæcyparis pisifera obtusa nana
Alangium chinense
Alangium begoniifolium
Poncirus (Citrus) trifoliata
Acer opulifolium
Rosa bracteata
Amygdalus persica
Prunus tenuifolia
Cotoneaster foveolata
Cercis canadensis
Laburnum vulgare
Ilex aquifolium
Hypericum prolificum
Diospyros (E. H. Wilson, No. 3615)
Erica stricta
vagans
Enkianthus perulatus
Viburnum cassinoides

While none of the above can possibly recover, for the next group of species there is hope that they may grow again. They were killed to the ground, but are now making new growth. All of the growth is dead and to regain their former stature will, in some cases, take years.

Shrubs and Trees Killed to the Ground but Making New Growth

Taxus baccata
Cunninghamia sinensis
Myrica Gale
Mahonia aquifolium
Calycanthus floridus occidentalis
Rosa helvetica
Prinsepia (Purdom No. 324)
Malus rivularis
Magnolia obovata
Cercis japonica
Spartium junceum
Coriaria japonica
Euonymus japonicus
Ilex Fargesii latifolia
Styrax americana
Jasminum nudiflorum
Vitex Agnus-castus
Buddleia nivea yunanensis

None of these, as horticultural subjects, could be relied upon, judging by the experience of last winter, as after a few seasons' growth, and just as they are about to become handsome specimens, an exceptional winter would cut them back to the roots.

In nearly the same category, so far as reliability of continued growth is concerned, is the following list. In all of these the winter-killing, while not down to the ground, has been very severe, sometimes the loss representing the growth for three or more years. All of them are alive and doing well, but there are great gaps in many of them, and in most the winter-killed wood is in unsightly contrast to the young growth just starting. In many of these the recovery will take from one to three years, and in the conifers many of the plants will never make perfect specimens again.

Shrubs and Trees Severely Winter-Killed, but now Making Recovery

Evergreens

Pinus Massoniana
Picea Abies dumosa
Abies inverta
polita
obovata
pungens
Abies Veitchii
Sachalinense
numidica (nearly dead)
pectinata
cephalonica
firma (nearly dead)
Thuya orientalis
occidentalis lutea
Juniperus pyramidalis
Chinensis aurea
Pfitzeriana (½ a plant with 8 ft. spread dead)
Cryptomeria japonica
dachryoides
Tsuga canadensis
Cedrus Libani
Chamaecyparis nutkatensis
glauca (nearly dead)
nutkatensis glauca pendula (nearly dead)
leptoclada
obtusa nana
Sequoia gigantea (nearly dead)
Cephalotaxus drupacea
Harringtoniana fastigiata
Taxus canadensis
Ephedra distachya

Deciduous

Salix incana
rostrata
Morus Cathayana
Ulmus alata
Quercus cerris
Magnolia macrophylla
stellata
Clematis montana platysepala
Berberis aggregata
(Wilson No. 4173)
Wallichiana
Itea virginica
Ptelea trifoliata
Poncirus (Citrus) trifoliata
Ilex opaca
Clethra alnifolia
Leucothoe racemosa
Enkianthus perulatus
Pieris floribunda
japonica
Potentilla fruticosa
Rubus idaeus aculeatissimus
odoratus
Prunus (Purdom No. 284)
Prunus chamaecerasus
Pyrus elaeagnifolius.
Cercis canadensis
japonica
Colutea arborescens
Cytisus Laburnum
Styrax japonica
Ligustrum amurense
sinense
Jasminum nudiflorum (did not flower for first time since 1911)
Clerodendron trichotomum
Paulownia tomentosa (nearly dead)
Lonicera involucrata
Viburnum cassinoides
Baccharis halimifolia

Much less seriously injured are the following. In most cases they were winter-killed only a foot or two, and not on all the branches, so that the vigorous new growth is just now obscuring the winter's damage.

Shrubs and Trees Only Slightly Winter-Killed and Making Rapid Recovery

Abies Nordmanniana (young plants apparently untouched)
Picea pungens glauca
Cryptomeria Japonica Lobbii
Chamaecyparis obtusa nana
Salix vinimalis
Celtis australis
(Wilson No. 343)
Broussonetia papyrifera
Carpinus Betulus
Magnolia Soulangeana
Fraseri
Deutzia scabra

Philadelphus Lemoinei
Gleditsia triacanthos
Corylopsis pauciflora
Stachyurus praecox
Ilex Sieboldii (both red- and white-fruited forms)
crenata
Phillyraea angustifolia
Ligustrum media
Buddleia intermedia
Catalpa ovata
Lonicera deflexicalyx
Koehneana
Diervilla japonica
Viburnum rhytidophyllum
betulifolium
Symphoricarpos orbiculatus

A summary of the results of the winter on our woody collections shows that there were:

Killed outright	28 species and varieties.
Killed to the ground	20 species and varieties.
Severely winter-killed	70 species and varieties.
Slightly winter-killed	28 species and varieties.

As many of these were in duplicate or triplicate the disastrous effects of the winter were very noticeable during April and May, but fortunately recovery of the slightly and severely winter-killed species is making fairly rapid progress, so that by midsummer the collections, except in the most stubborn species, will be in fair condition. Of course, those killed to the ground are practically of no use to us for years to come. It will be noted that some species are found in more than one place in the lists. This indicates that we have several specimens and that their reaction to the winter has varied. It seems better to include them in two places rather than arbitrarily assign them to one, which might hide the facts.

In addition to the species listed above, nearly all our box and some privet was either killed or so severely winter-killed as to need replacement.

NORMAN TAYLOR

ENDOWMENT OF SCHOLARSHIP AND PRIZES

In September, 1914, the Garden inaugurated its first annual Children's Garden Exhibit, as announced in the Brooklyn Botanic Garden *Leaflet* of June 3, 1914. The cost of the trophies, cups, medals, and other prizes awarded at these exhibits has been met from income derived from tuition and sales. This source of revenue has been uncertain, and, in consideration of other demands made upon it, inadequate. It is therefore a pleasure and satisfaction to announce that the chairman of the Botanic Garden Governing Committee, Mr. Alfred T. White, has made provision for these prizes for 1918 and annually thereafter.

The most important of these prizes is a scholarship of the value of $100 to be awarded to the boy or girl who has taken class work at the Brooklyn Botanic Garden for not less than three years, and who has shown marked ability along botanical and agricultural lines, both at the Garden and in his high-school courses, as attested by his principal and teachers. This will be known as the *Alfred T. White Scholarship,* and will be awarded for the first time in 1920. Further information may be obtained by addressing the director of the Garden.

Details as to this and some of the other prizes are published in the Brooklyn Botanic Garden *Leaflet* of June 20, 1918. Special mention, however, should here be made of the offer of two first and two second prizes (one for boys and the other for girls) of War Savings Stamps to the value of $15 and $10 respectively for excellence in back-yard gardens; and of two other prizes (one for boys and one for girls) of $10 each, in War Savings Stamps, for making the best use of a plot of ground in the children's gardens at the Brooklyn Botanic Garden.

In addition to the above, twenty prizes of ten Thrift Stamps each (ten to boys and ten to girls) will be awarded to those who are most generally helpful in connection with the children's garden at the Botanic Garden. Promptness, regularity of attendance, effort, accomplishment, and other points will form the basis of this award. The War Savings Stamps and Thrift Stamps will be awarded only for the period of the present war.

WAR GARDEN LECTURES, 1918

Free public lectures in the auditorium of the laboratory building were inaugurated on Wednesday, March 6, when the first of a course of three lectures on "The Small Vegetable Garden" was given by Mr. Montague Free, Head Gardener. The titles and dates of these lectures were as follows:

1. Getting Ready: Planning, preparation of the soil. Wednesday, March 6; Sunday, March 10.

2. Keeping Busy; Seeds, planting, cultivation, thinning, insects. Wednesday, March 13; Sunday, March 17.

3. The Reward: Harvesting, storing for winter use. Wednesday, March 20; Sunday, March 24.

Lectures were continued from April 3 to May 26 as follows:

April 3 and 7. *Farming for Women.* Miss Sophia de M. Carey, official lecturer for the British government. Miss Elizabeth Cleveland and Mrs. Florence Young, Bedford Farmerettes and members of the Woman's Land Army of America.

April 14. *The Back Yard Vegetable Garden.* Miss Jean A. Cross, Assistant Curator of Elementary Instruction.

April 21. *Forest Products and the War* (Arbor Day Lecture). Prof. Samuel J. Record, School of Forestry, Yale University.

April 28. *Diseases of Garden Crops and How to Control Them.* Dr. Edgar W. Olive, Curator of Public Instruction.

May 5. *Plant Breeding and Increased Food Production.* Dr. Orland E. White, Curator of Plant Breeding.

May 12. *Bacteriology and the War.* Dr. Ira S. Wile, former member of the Board of Education, New York City.

May 19. *Garden Insects—Good and Bad.* Dr. E. P. Felt, State Entomologist of New York.

May 26. *Cultivation of Drug Plants.* Dr. W. W. Stockberger, in charge of drug and poisonous plant investigations, U. S. Department of Agriculture.

SCIENCE IN PEACE AND WAR

"It required the cataclysm of the Great War to bring men to realize fully the part which applied science is playing and, more

particularly, will play in the life of nations. As men have come to know that everything in modern warfare is controlled in a large measure by science—no gun of large caliber is located or fired without its aid—so they have come to know that in the making of things—in the economy and progress of manufacturing operations—science must have a place, an important place too."*

The following quotation from a letter to the Director from the Secretary of the Royal Botanic Society of London, concerning the suspension of the Society's *Journal* during the period of the war, is not quite so optimistic as to the general recognition of the value of science in peace and war, but indicates how completely the people of England have made everything secondary to winning the war, and how completely all their resources are being utilized to this end. "In this country, it is a truism that science does not pay, and now with the mind of England intent upon the fighting line, and all our activities devoted to that end, there is little time and less money for peaceful scientific pursuits. The editor of the *Journal* (of the Royal Botanic Society) is engaged in a munitions laboratory, and our Botanic Garden is growing vegetables and giving a helping hand to a great hospital for wounded and invalided soldiers, for the council of the Society, at the beginning of the war, opened its gates to all wearers of uniform, and it is with very great satisfaction they have noted your own among the number."

In his address at the fiftieth annual commencement of Cornell University, on May 22, 1918, President Schurman, calling attention to Germany's advantage over her enemies because of the encouragement she has given to scientific research for a generation, spoke as follows:

"Germany has the advantage over all her opponents, especially over Great Britain and the United States, in the solid fabric of science she has constructed during the last generation by means of generous government encouragement of and appropriations for scientific research and instruction. Our Government to-day, instructed by the war, is ready to spend billions of dollars for new scientific truths in which, prior to the war, it felt no concern and for which it would make no provisions."

* *Science,* May 10, 1918, p. 450.

A typical example of the condition in the United Kingdom is found in the situation in New Zealand. The government appropriated £500 to the New Zealand Institute for *applied* scientific research which the Institute was expected to publish, but refused to allow any of the funds to be applied to the expense of publication, or to make a separate appropriation for that purpose. A New Zealand correspondent of the writer thus describes the situation:

"You have here a government, *i. e.*, the people, so ignorant of what science is that they decline to give money for publishing, say, a research dealing with the segregation of pure varieties from a specific group for the eventual study of heredity, but willingly giving a grant for certain preliminary observations regarding the finding of water in an area abounding in streams. The marvel, however, was that a water diviner was not called in, as has been frequently the case."

Aware of the truth of the first quotation above, that "everything in modern warfare is controlled in a large measure by science," and moreover that modern industry, medicine, agriculture, communication, transportation, and other pursuits of peace are largely controlled by or absolutely dependent upon science, the scientific man is always perplexed to understand a lack of appreciation of the importance of scientific research from those who are daily so dependent upon its results. How can it be a truism in England to-day that "science does not pay?" Yet such is undoubtedly the case, as it is here in America in quarters where one might least expect it.

A Brooklyn newspaper, commenting editorially on the research work in progress at the Botanic Garden, as set forth in the *Annual Report* for 1917, stated that experiments in plant breeding with peas would never result in any increase in the pea crop on Long Island.

As though the ability to raise more peas on Long Island were the only, or even the chief, justification for a study of the laws of inheritance in living things! But worse yet, what shall we say of the state of mind of one who feels justified in predicting, without qualification, what will or will not be the ultimate result of any piece of scientific investigation? Increase of yield, many

fold, has been the direct or indirect result of botanical research in the case of many important crops, and often by the application of knowledge ascertained with no utilitarian object in mind, beyond that of the advancement of pure science. That the advancement of pure science is a utilitarian pursuit, justifiable and even essential for its own sake, and even worthy of support by public taxation, may some day come to be more generally recognized, even by those who assume the grave responsibility of molding public opinion through the editorial columns of the daily newspapers.

Says President Osborn, in the *Annual Report* of the American Museum, for 1917: "This war is eighty-five per cent. science and fifteen per cent. human courage and endurance." How much more is this true of the pursuits of peace—of the very foundations of modern civilization. C. S. G.

NATIONAL RESEARCH COUNCIL TO BE MADE PERMANENT BODY

The *Official Bulletin* of May 14, 1918, contains the following executive order:

"The National Research Council was organized in 1916 at the request of the President by the National Academy of Sciences, under its congressional charter, as a measure of national preparedness. The work accomplished by the council in organizing research and in securing cooperation of military and civilian agencies in the solution of military problems demonstrates its capacity for larger service. The National Academy of Sciences is therefore requested to perpetuate the National Research Council, the duties of which shall be as follows:

"1. In general, to stimulate research in the mathematical, physical, and biological sciences, and in the application of these sciences to engineering, agriculture, medicine, and other useful arts, with the object of increasing knowledge, of strengthening the national defense, and of contributing in other ways to the public welfare.

"2. To survey the larger possibilities of science, to formulate comprehensive projects of research, and to develop effective means of utilizing the scientific and technical resources of the country for dealing with these projects.

"3. To promote cooperation in research, at home and abroad, in order to secure concentration of effort, minimize duplication, and stimulate progress; but in all cooperative undertakings to give encouragement to individual initiative as fundamentally important to the advancement of science.

"4. To serve as a means of bringing American and foreign investigators into active cooperation with the scientific and technical services of the War and Navy Departments and with those of the civil branches of the government.

"5. To direct the attention of scientific and technical investigators to the present importance of military and industrial problems in connection with the war, and to aid in the solution of these problems by organizing specific researches.

"6. To gather and collate scientific and technical information, at home and abroad, in cooperation with governmental and other agencies, and to render such information available to duly accredited persons.

"Effective prosecution of the council's work requires the cordial collaboration of the scientific and technical branches of the government, both military and civil. To this end representatives of the government, upon the nomination of the National Academy of sciences, will be designated by the President as members of the council, as heretofore, and the heads of the departments immediately concerned will continue to cooperate in every way that may be required.

"WOODROW WILSON."

"THE WHITE HOUSE,
11 May, 1918."

HEARING ON PROPOSED RESTRICTIONS ON THE IMPORTATION OF PLANTS

At a public hearing held in Washington on May 28, more than a hundred people attended to present arguments pro and con re-

garding the proposed restriction or prohibition of the importation of nursery stock into the United States. In issuing the call the Federal Horticultural Board sent to those interested the following proposals, which in their opinion were necessary:

"*A.* That all foreign-grown balled, tubbed, or potted plants, except as noted under *B*, be excluded in accordance with the following groups and dates:

"*Group 1.*—Azaleas, rhododendrons, palms, araucarias, bay trees, hollies, ericas, and acacias, January 1, 1923.

"*Group 2.*—Conifers, dwarf and other kinds, Buxus, etc., usually shipped as specimen plants, July 1, 1919.

"*Group 3.*—Small potted plants, including roses, chrysanthemums, violets, tender bedding plants, ferns, tropical and sub-tropical plants, etc., January 1, 1919.

"*Group 4.*—Clumps of hardy perennials used in forcing, Japanese maples, magnolias, etc., July 1, 1919.

"*B.* That provision be made for the admission of limited numbers of new varieties or novelties out of pots not exceeding two inches in diameter, this work to be conducted through the Department under rules and regulations prescribed by the Federal Horticultural Board.

"*C.* That no action be taken at this time toward the exclusion of *all* stock from the Orient, and other little explored parts of the world, but that steps be taken looking toward action in the near future of excluding certain groups of plants, especially from the Orient.

"These recommendations are presented for discussion, but, as indicated in the opening paragraph of this statement, are not to be taken as limiting the scope of discussion nor the ultimate action of the Department."

Representatives of practically all the leading nurserymen and florists were present and actively opposed this on the ground that, in this country, the propagation of many of these plants is very difficult or impossible, and that therefore, to quote one of them, "the ruling would set back American horticulture for fifty years." Most of us do not realize the tremendous size of the importations of nursery stock from Holland, Belgium, England, and

France. In certain groups of ornamental shrubs and trees, in some stocks for fruit trees, roses, etc., practically our total supply comes from abroad. The shutting off of this supply would mean either drastic readjustments, or else the substitution of stock propagated in this country.

Plant pathologists and entomologists, at whose suggestion the hearing was held, pointed out that nearly all the most destructive pests which have worked such havoc have come in through nursery stock, and that the only way to guard against further depredations is to pass the above proposals or even more immediate or drastic ones.

Some of the speakers urged the necessity of caution and suggested the elimination of the infection through quarantine at our ports, or abroad before shipment, rather than the total prohibition of the plants that are assumed to be carriers of the infection or insect pest. Experts of the board confessed that no effective system of quarantine had yet been discovered, and that the proposals under discussion were the only way that they could devise out of a difficult situation.

Importations of certain plants will be permitted through the Bureau of Plant Industry, but this would be of slight commermercial advantage.

No action was taken at this hearing, but barring new evidence, it appears that the action of the Federal Horticultural Board will be along the lines suggested above. If that is done, most of our rhododendrons, azaleas, hollies, box, and roses will be available only as propagated in America. The majority of nurserymen agree that anything like an adequate supply will be out of the question for years, if the board takes the action which, in their opinion, is necessary for the safety of American agriculture and horticulture.

NOTES

The initial planting of the iris collection, extending along both sides of the brook, has been labeled, and the flowering season extended from about May 15 to June 30. Sixty out of over ninety varieties that were planted last fall have come into bloom.

Mr. Montague Free, head gardener, gave a talk on "Home Gardening" before employees of the City of New York, at the Municipal Building, Manhattan, on April 16.

The Brooklyn Heights Seminary Club held its spring meeting at the Garden on May 20. The indoor meeting and box luncheon were followed by an inspection of the grounds under the guidance of a member of staff.

The annual meeting of the Woman's National Farm and Garden Association was held at the Garden on Thursday, May 23, the president of the association, Mrs. Francis King, of Alma, Michigan, presiding. The business session and luncheon were followed by a brief address by the director of the Garden, and an inspection of the grounds.

The sixth annual Spring Inspection of the Garden by trustees, members and their friends, was held on the afternoon of May 28. On account of a severe thunder shower the visit to the plantations followed the serving of tea in the rotunda of the laboratory building. During the assembling of guests in the lecture hall, colored lantern slides of native spring wild flowers were exhibited.

The Garden library has recently received a number of gifts from Mrs. Annie Morrill Smith, including over fifty photographs of botanists, authors' original drawings of published papers on hepatics, mosses and lichens, autograph letters of botanists, and valuable manuscript and correspondence.

Addition to Endowment.—On June 13 the treasurer of the Institute received from two anonymous donors a gift of securities of the par value of ten thousand dollars, as an addition to the permanent endowment of the Brooklyn Botanic Garden, and to be known as the Benjamin Stuart Gager Memorial Fund. At the request of the donors, the income from this fund is to be expended for publications for the library or otherwise as the present director of the Garden may designate.

Miss Sophia deM. Carey, official lecturer for the British government, addressed the meeting of the Flatbush Garden League, held at the Garden on the afternoon of June 14.

Prof. George M. Reed, for two seasons resident investigator at the Brooklyn Botanic Garden, has been appointed in charge of the Cereal Disease Survey in the states of Louisiana, Arkansas, Missouri, Iowa and Minnesota. At present six men are doing field work under his direction. After the survey is completed, it is planned to inaugurate control measures.

An Emergency Supply of Rubber.—The department of botany of the University of California has undertaken a study of certain West American shrubs belonging to *Chrysothamnus* and other genera of the Compositae to determine whether or not an emergency or supplementary supply of rubber exists in such native plants. This investigation is one of the projects of the botanical subcommittee of the Pacific Coast Research Conference acting under the Council of Defense of the state of California. Results thus far obtained indicate that the total amount of rubber present in these native species is considerable, but that the percentage yield of individual plants is too small to render its extraction profitable at present prices. If, however, the importation of raw rubber should be curtailed through enemy action, this emergency supply existing within the border of the continental United States could be utilized. It might be noted here that the quality of this new rubber is, according to rubber experts, somewhat better than the best grades of guayule, but not as good as Para." (*Science*, May 10, 1918, p. 452.)

Twenty-nine signatures were secured for enrollment in the Woman's Land Army of America, at a meeting held at the Garden April 7, under the joint auspices of the Garden and the Woman's Land Army.

In the drive of May 20–27, 1918, for subscriptions to the Second War Fund of the Red Cross, one hundred per cent. of the employees of the Brooklyn Botanic Garden were enrolled as subscribers, the total amount of the subscription being $225.20.

Banana Plant Quarantine (Foreign).—The acting Secretary of Agriculture has issued Notice of Quarantine No. 31, stating that, on and after April 1, 1918, the importation into the United States from all foreign countries of all species and varieties of banana plants (*Musa* spp.), or portions thereof is forbidden. The purpose of this quarantine is to prevent the introduction of an injurious insect, the banana root-borer (*Cosmopolites sordidus* Germar), new to and not heretofore widely prevalent or distributed within and throughout the United States. An exception is made of specimens imported for experimental or other scientific purposes, and the order places no restrictions on the importation of the fruit of the banana.

Dr. Olive spent June 3–8 in company with Prof. H. H. Wetzel, of Cornell University, in a week's trip to study the plant disease conditions among the orchards and farms of the Hudson River Valley. This work is carried on in cooperation with the United States Department of Agriculture in an effort to increase food production by the checking and cure, as far as possible, of plant diseases. Much winter injury was encountered among the apple and other fruit trees, as well as considerable apple rust, onion smut, asparagus rust, and other similar diseases. Collections were made of most of these diseases, and much information was disseminated among the farmers and county farm bureau agents looking to disease control.

A Botanical Highway.—The Christian Science *Monitor* is authority for the statement that the Pacific Highway, designed to extend from British Columbia to Mexico, will be developed on either side as a continuous botanic garden and arboretum. Portions of this international roadway were constructed before the United States entered the war. According to the *Monitor* the movement to develop the highway along botanical lines was started in Santa Barbara, Calif., by the World's Botanical Garden Association. It is stated that the central garden and nursery for southern species will be located at Santa Barbara. The botanic garden idea is spreading in America. The editor of the RECORD has elsewhere urged the establishment of botanic gardens in all American cities having a population of 10,000 or more.

FIG. 5. View looking east from the southeast corner of Mt. Prospect Reservoir, 1860. The unimproved land in the middle distance is largely within the present boundaries of the Botanic Garden.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. VII October, 1918 No. 4

A BRIEF HISTORY OF THE BOTANIC GARDEN IDEA IN BROOKLYN

From all available information it appears that the proposition to establish a botanic garden in Brooklyn first took definite form in an act of the Legislature, passed April 9, 1855. That act reads as follows:

"AN ACT to incorporate the Brooklyn Hunt Botanical and Horticultural Garden of the county of Kings.

Passed April 9, 1855, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly do enact as follows:

1. John W. Degraauw, John Maxwell, Smith I. Eastman, John W. Towt, Stephen Knowlton, William S. Dunham, Milton Arrowsmith, Martin L. Schaefer, Abraham J. S. Degraauw, Thomas Hunt, Peter B. Mead, Michael McGrath, Henry A. Kent, William C. Langley, Edward H. R. Lyman, John H. Prentice, Rollin Sanford, Esther Howe, William W. Crane, A. Cook Hull, Emerson S. Howard, Wilson G. Hunt, George S. Coe, William S. Henman, John Halsey, George Halsey, George Ingram, Lewis B. Lozier, William Lawton, Cornelius Bennet, Edward W. Fiske, James S. T. Stranahan, Chandler L. Starr, James Cruikshank, James Hasleburst, John B. King, Theodore Polhemus, Jr., John Vanderbilt, Horace B. Claflin, John N. Taylor, Ethelbert S.

Mills, Alfred Large, J. E. Rauch, H. A. Graef, and their associates, and such other persons as shall become members of said society, shall be and are hereby declared and constituted a body politic and corporate by the name or title of the "Brooklyn Hunt Botanical and Horticultural Garden of the county of Kings."

2. The business and objects of said corporation shall be to improve and encourage horticulture, establish and maintain botanical, ornamental and experimental gardens, and otherwise to promote and extend the knowledge of horticulture, botany, and landscape gardening.

3. The gardens and buildings of said corporation shall be located in said county of Kings, and the said corporation may hold, purchase and convey real and personal estate for the purposes aforesaid.

4. The said corporation, its affairs and property shall be managed by such number of trustees, and in such manner as the members of said society shall, from time to time, by their constitution or by-laws direct, and until such trustees shall be elected, the persons named in the first section of this act shall be the trustees thereof.

5. This act shall take effect immediately.

Laws of New York, 78th Session, 1855
Chap. 224, p. 332.

The incorporators of this garden certainly could not be accused of acting in a dilatory manner, for on the evening of the second day after the passage of the above act, a meeting was held under the auspices of the Brooklyn Horticultural Society, at which there was delivered, by the Rev. Dr. Francis Vinton, an address inaugurating the garden. The title page of this address, as printed, reads as follows:*

Address | at the | Inauguration | of the | Hunt Botanical Garden, | in | Brooklyn, N. Y., | delivered in the Athenaeum, | at the |

* The printed copy of this address was first brought to the writer's attention by Mr. H. V. Letkemann, of Brooklyn, in 1911. This copy was secured from Mr. Letkemann and presented to the Botanic Garden library by Mr. Alfred T. White, on January 17, 1916. Careful search had previously failed to locate a second copy, though a second copy has since been obtained.

Vernal Exhibition of Flowers, | of the | Brooklyn Horticultural Society, | On the Evening of April 11, 1855. | By | Francis Vinton. | Published by Order of the Society. | Brooklyn: | Hogan & Heighway, Printers. |

In extending to Dr. Vinton their invitation to deliver this address, the Committee of the Horticultural Society made the following statement:

"We have secured a Horticultural Garden; for Thomas Hunt, Esq., would give to the society near sixty thousand dollars; fifty thousand dollars by subscription in money and one third of the ground which the garden would occupy.

"Wm. C. Langley, Esq., would give one third of the land with five thousand dollars in money.

"Henry A. Kent, Esq., would give the remaining third of the garden plot, subscribing besides twenty-five hundred dollars—making a total in land and subscriptions in money, of over eighty thousand dollars, from these three munificent citizens of Brooklyn. Besides this grand endowment, thirty-thousand dollars have been subscribed by other liberal persons: requiring only about sixty thousand dollars more of the stock to be taken, when the great enterprise would be accomplished for the advancement of science, and for the promotion of the happiness of ourselves and our children."*

It thus appears that, in addition to the gift of land, a fund amounting to eighty-seven thousand five hundred dollars ($87,500) was subscribed, and that the total sum to be raised was about one hundred and fifty thousand dollars ($150,000).

In the closing paragraph of the address the speaker referred to "this Glorious Garden, which is to become Brooklyn's pride and joy, (where I hope to see the Astronomical Observatory† rearing its tall form towards heaven, and in whose neighborhood I trust to behold the University established, that shall train your youth amidst its charms). . . ."

* Pp. 7 and 8 of the printed address.

† It is interesting to note that an astronomical observatory was also in the minds of those who first conceived the present Brooklyn Botanic Garden, and the maps of the Garden show at the north end, adjacent to Mt. Prospect reservoir, an area "Reserved as a site for an astronomical observatory."

Interested to learn what further steps were taken toward the establishment of the botanic garden so auspiciously launched on the evening of April 11, 1855, the writer consulted Stiles's His-

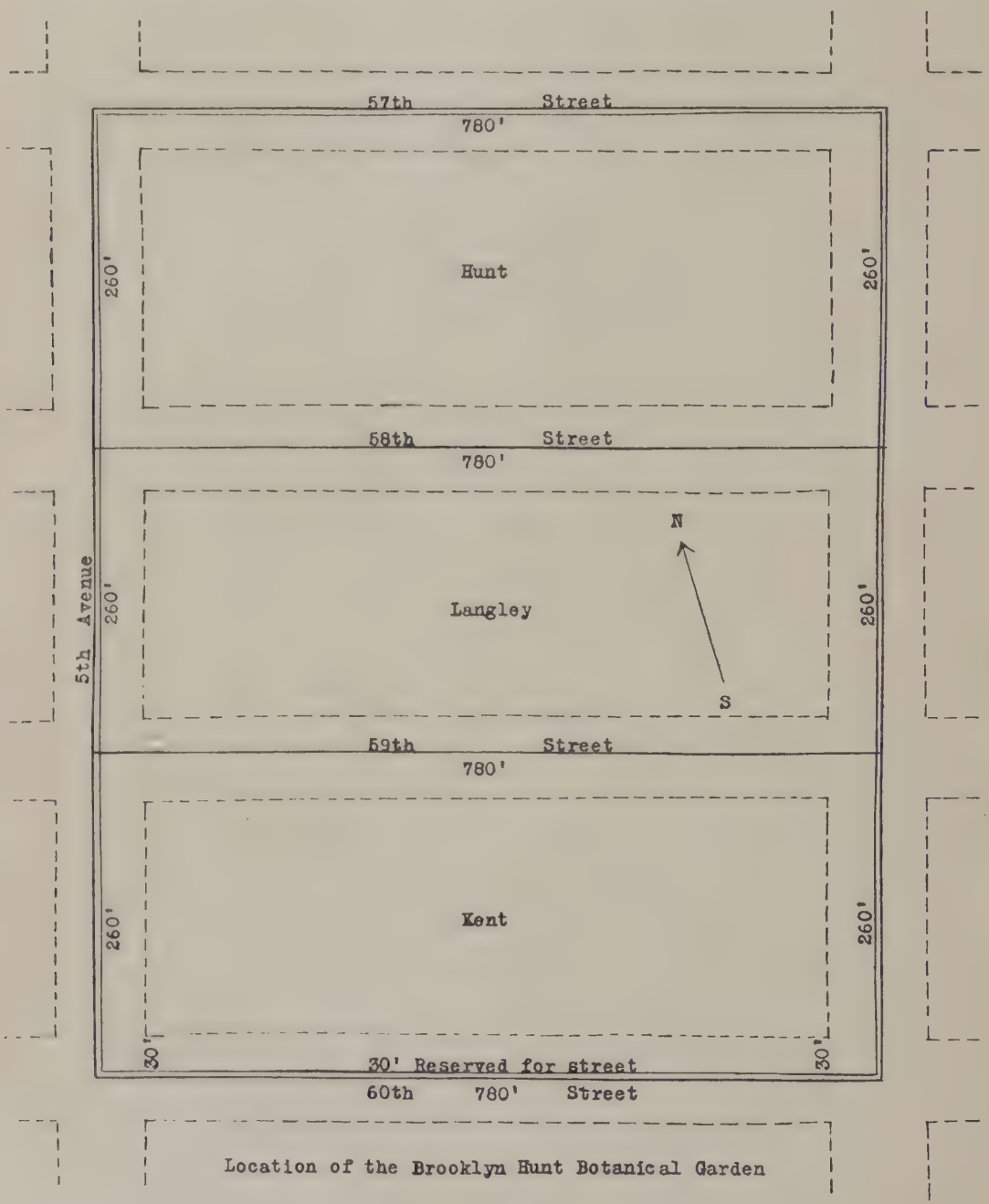

FIG. 6. Diagram showing the location of the Brooklyn Hunt Botanical and Horticultural Garden, 1855.

tory of Brooklyn, and found (Vol. III, pages 923–924) the following paragraphs:

"*The Brooklyn Horticultural Society* was organized in February, and incorporated in April, 1854, under the auspices of some of our most enterprising citizens. The two earliest exhibitions of the society were given at the Athenaeum in the months of March and April, 1854, of hothouse and greenhouse plants from the conservatories of gentlemen connected with the society, and other citizens. The President was John W. Degrauw, Esq. The society is now extinct.

"*The Hunt Horticultural and Botanical Garden,* incorporated April 9, 1855, with a capital of $150,000, was the legitimate offspring of the Brooklyn Horticultural Society; 'it having been the cherished design of that society from the first, to bring about the establishment within or near the borders of our city, of an institution, kindred in its nature and objects, to their own, and by means of which the accomplishment of their department, in the work of developing and perfecting the art of horticulture, might be greatly facilitated. The consummation of the project was principally due to John W. Degrauw, and Wm. S. Dunham, Esqs., the president and treasurer of the B. H. Society, whose energetic and persevering efforts carried the matter to a successful issue, and to the liberality of Messrs. Thomas Hunt, William C. Langley, and Henry A. Kent, who together contributed in fee sixteen acres of ground (valued at the present time at $25,000), to be devoted to the purposes of the institution. These three gentlemen, also, subscribed largely to the stock of the institution, the former standing sponsor for the sum of $50,000, and the others $14,000 and $10,000, respectively.

"The site of the Garden was between Fifth and Sixth avenues, and Fifty-seventh and Sixtieth streets (comprising three blocks) on the southwestern boundary of the city of Brooklyn. The portions of the two streets laid out on the map, that intersect the site, were to be obliterated, and the three blocks to be consolidated into a square, the sides of which will measure nearly seven hundred feet. Here its originators hoped to found a garden which shall contribute its fair share to the cultivation of the 'love of the beautiful,' and confer enduring honor, not only on its projectors, but also on the city that gave it birth. The enterprise, however, was relinquished several years ago."

The query naturally arose as to what disposition was made of the endowment money and property. Through the good offices of Judge Thomas I. Chatfield, of the United States District Court, Brooklyn, a search was made for the records of deeds of the property comprising the site of the proposed garden. The following transfers are recorded in the Hall of Records, county of Kings, New York State.

Deed, Bargain and Sale: Dated and acknowledged April 30, 1855. Recorded May 5, 1855. *Liber* 393, *c.p.* 544, h. 9 A .M. *Grantors:* Thomas Hunt and Emeline Sibella, his wife. *Grantees:* Brooklyn Hunt Botanical and Horticultural Garden of the County of Kings. *Located* as follows: In the 8th ward, beginning at the intersection of the center line of 57th St. and the center line of 5th Ave., thence south 260 ft., to the center line of 58th St., thence east along the center line of 58th St. 780 ft. to the center line of 6th Ave., thence north along the center line of 6th Ave. 260 ft. to the center line of 57th St., thence west along the center line of 57th St., 780 ft., to the point of beginning. The grantor conveys the above premises on the condition that it remain as long as used by the grantee; otherwise said premises is to revert to the grantors; or if the grantee shall remove from said premises, then the same is to revert to the grantor or his heirs.

Similarly (*Liber* 393, *c.p.* 547–550), on the same date, William C. Langley and Sarah A. H. Langley, his wife, convey the premises on 58th and 59th Sts., between Fifth and Sixth Avenues, Brooklyn, on the condition that it remain as a horticultural garden only; and Henry A. Kent and Sarah W. Kent, his wife (*Liber* 393, *c.p.* 550–552) convey the property on 59th and 60th Sts., between Fifth and Sixth Avenues, also on the condition that the property remains as a horticultural garden only, reserving the right to 30 ft. on the south for a street (now 60th St.).

Evidently the terms of the deeds were not, or could not be complied with, for in *Liber* 426, *c.p.* 542, it is recorded (June 26, 1856), that on April 10, 1856, the Brooklyn Hunt Botanical and Horticultural Garden of the County of Kings gave to Thomas Hunt a quit claim deed of the property donated by him the preceding April; and quit claim deeds (as of April 10, 1856) from the Garden to William C. Langley (*Liber* 427, *c.p.* 33–34, June 26,

1856), and to Henry A. Kent (*Liber* 427, *c.p.* 34–36, June 26, 1856), of the properties donated the preceding year by them.

Fig. 7. Viele's plan for the improvement of Prospect Park, 1861. The top of the plan is toward the south. The "Botanical Garden" is indicated in the upper right hand (southwest) corner. The present Brooklyn Botanic Garden includes the land between Washington and Flatbush Avenues, including New Avenue and several acres south of it. "The Flower Garden" is also in the present Botanic Garden, being part of the north addition, incorporated in the Garden on September 9, 1912. Eastern Parkway now passes through the area designated "The Plaza."

Thus, after one brief year, there passed into history the laudable but unsuccessful institution, which, in the closing words of the dedicatory address, should "year after year . . . bless, more and more, the young and the aged, the rich and the poor, young men and maidens, old men and children, parents and friends, to the Latest Generation."

The site of the proposed garden (Fig. 6) is now completely occupied with stores and apartment houses, in marked contrast to the "glorious garden," which, in the words of the dedication orator, Dr. Vinton, "is to become Brooklyn's pride and joy, where

I hope to see the Astronomical Observatory rearing its tall form towards heaven, and in whose neighborhood I trust to behold the University established, that shall train our youths amidst its charms."

The next published reference to a botanic garden in Brooklyn appears to be that in the *Report* of Egbert L. Viele, Esq., January 15, 1861, to the Commissioners for the Improvement of Prospect Park, as follows:

"Crossing the head of 'The Lake' by a rustic bridge, the road descends into the eastern valley—a slightly undulating plain, partly wooded and partly lawn—where it is proposed to locate 'The Botanical Garden.' Its position, sheltered from the north and with a southern exposure, together with its well drained alluvial soil, admirably adapt it for this purpose. The beauty and utility of such a feature within the park cannot be questioned. Whether the improved cultivation and careful development of indigenous and exotic trees and plants shall be placed in the hands of an independent association of citizens, like the Horticultural Society, the space being set apart for this purpose, or whether this shall form one of the duties of the Commissioners, is a question not germain to this report to discuss. I earnestly hope, however, that in one way or the other, this desideratum may be accomplished. It cannot fail to prove of great value and importance to many, while it will assuredly be a matter of interest to all." (First Ann. Rept. of the Comm. Prospect Park, Brooklyn, 1861, p. 31.)

Viele's plan for the improvement of Prospect Park (reproduced in Fig. 7) shows the location of the proposed botanic garden, and also the site of the present Garden, south of the reservoir. It is interesting to note, on the plan, that the area adjacent to Mt. Prospect reservoir on the east is designated as a "flower garden." This area constitutes part of the "north addition" to the original area of the present Garden, between the reservoir and the Brooklyn Museum, facing north on Eastern Parkway.

The above plan was never carried out in the development of Prospect Park, but in the *Report of the Landscape Architects,* Olmsted, Vaux & Co., to the Board of Commissioners of Pros-

pect Park, January 24, 1866,* it is urged that the park land east of Flatbush Ave., now comprised within the grounds of the Brooklyn Botanic Garden, be devoted to educational purposes, especially such as would be supplemental to the book work of the public schools. Under the caption "Museums and other educational edifices," the report reads as follows:

"Although the ground now held by your Commission, east of Flatbush avenue, does not appear to us desirable to be retained for the purpose for which it has been assigned, it will nevertheless be an advantage to the park, if a small section of it, abutting on Flatbush avenue and facing the park, remains in the possession of the city. We therefore desire to offer a suggestion as to the use to which it may be appropriated.

"It is undesirable that any duties or responsibilities should be assumed by legislative bodies that can be equally well undertaken by citizens, either individually or associated in their private capacity. The exact limit of judicious legislation in this way cannot, however, be defined, and while there are many public responsibilities that clearly cannot be assumed by individual citizens, and many more that can, there are some few that are of an intermediate character, and that require special consideration. It is, for instance, generally conceded that a system of popular education is an essential part of a republican government, but it is by no means determined what means of education should be secured to all, and to what extent the public can be taxed, with reasonable assurance of a saving to the tax payers through a reduction of taxes for courts, police, prisons and poorhouses, and the general cheapening of the necessaries of life by the increased capacity for productive labor of the whole community which may be obtained through the improvement of the educational system.

"It is very desirable, therefore, that plans should, if possible, be adopted by our municipal bodies, which will admit of strict construction, and at the same time be no bar to the progressive improvement of our methods of education. At present, book learning and education are generally considered correlative terms, but the conviction is evidently fast gaining ground in the public

* Sixth Ann. Rept. Commissioners Prospect Park, pp. 114–116. Brooklyn, 1866.

mind, which has long been established with those who have given the most thorough consideration to the subject, that, although the ordinary chances of observation may be sufficient to make many branches of knowledge which are inculcated in books sufficiently intelligible, there are others, progress in which is of special value with reference to the enlargement of the mind and the development of healthy inclinations and habits, which cannot be pursued with much advantage in this second-hand way.

"Hence, it may be anticipated that the common school system of a large city will, sooner or later, be generally considered incomplete, unless ample opportunity is found within it for the direct exercise by every student of his perceptive faculties, in regard to a large class of objects not likely to come under his ordinary observation. The idea of education, it must be confessed by all, unquestionably culminates in the development of the reflective faculties, but the reflective faculties—which are secondary—can never, it is obvious, be healthily exercised if the perceptive faculties, which are primary, are neglected and starved.

"The question therefore is pertinent, even at present, whether the city, without absolutely assuming the whole expense and the whole control of undertakings for this end, may not wisely offer some encouragement to associations voluntarily formed by citizens for the purpose.

"Having some such views in mind as these, when we were preparing the design of Central Park, we advocated the retention of the building near the Fifth avenue and Fifty-ninth street entrance, formerly used as an arsenal, simply because it would probably, if retained, be found to be of sufficient value to be converted into the nucleus of a museum, and although it was very inconveniently located for any such purpose, taking the proposed landscape effects of the park into consideration, we felt that the opportunity was one that ought not to be lost. Our suggestion was adopted by the Commissioners, and the Historical Society has since asked for and obtained possession from them of this site and this building, with the understanding that it is to be improved and converted into a public museum at the expense of the society.

"This illustration is presented with no purpose of favoring the

FIG. 8. Map of Prospect Park and environs, 1871, by Olmsted, Vaux & Co. The triangular area between Jamaica (now Eastern) Parkway on the north, and East New York Avenue (now Lincoln Road), on the south, is the site of the present Brooklyn Botanic Garden, excepting the site of the Brooklyn Museum, on Eastern Parkway, the present grounds of Mt. Prospect Reservoir, and the three small blocks at the south.

introduction of large structures of this character within the limits of a public park, but rather to show that they ought in some way to be provided for in season. The suggestion we have to make in this case is that the stretch of ground abutting on Flatbush avenue, marked R.R., and now in the possession of the Commissioners, should be distinctly set apart for such purposes as we have indicated. If this suggestion is accepted, the lots fronting towards the park on this part of Flatbush avenue will probably, in course of time, be occupied by handsome buildings (Fig. 8), the objects of which will in some way be connected with the educational system of the city, but which will not be erected or owned by it, the terms on which the different sites would be given being such as to secure a share of control in the management of each institution, sufficient to ensure to the city an adequate return for the value of the land it parts with."

An idea of the condition of these lands at about this date (1860) may be obtained from figure 5.

Two items in the above quotation are especially noteworthy: first the clear discernment of a direct relation between the expenditure of public money for educational purposes and "a reduction of taxes for courts, police, prisons, and poor-houses"; second, recognition of the fact that "book learning and education" are not correlative terms, but that, in addition to the subjects generally taught in the common schools in 1866 (subjects taught wholly from books), "ample opportunity . . . for the direct exercise by every student of his perceptive faculties," that is, training in observation, is absolutely essential, unless the school provisions are to remain incomplete and inadequate, even though the development of the reflective faculties be regarded as the ultimate goal of education. All this before nature study had been heard of, and even before the value of its forerunner, "object lessons," was generally acknowledged.

It is interesting, in this connection to note that French philosophers, described by Bergson as the great imitators, are specially characterized by a tendency "to keep their ideas in close contact with the concrete problems of experience which suggested them." To this may doubtless be attributed, in large measure, the fact that "in no country as in France have the current philosophical

ideas permeated and influenced the great mass of the people." The study of science, fostered and facilitated by museums, botanic gardens, and zoological parks, is to be pursued not merely for its own sake, valuable as that is, but to secure a solid foundation and balance wheel for the exercise of the "reflective faculties"—for the study of philosophy that shall have meaning and value for the great mass of the people.

On such broad and advanced conceptions as those indicated above did the masterful architects of Prospect Park urge that the park area now comprising the Brooklyn Botanic Garden be set aside for museums and other educational purposes of a like nature. In the present Garden, by the combination of scientific research with popular education on a large scale, the recommendation of the original plan of fifty years ago is being carried out more closely than might have been anticipated.

In the *Ninth Annual Report* of the Commissioners of Prospect Park (January, 1869, p. 254), the need of a city, then seen to be rapidly approaching a population of one million, making ampler provision for its "young and aspiring historical, *botanical* and other kindred societies" was recognized. The park lands lying east of Flatbush Ave., but north of what is now Eastern Parkway had been considered as a possible site for a botanic garden or for a zoological park, but this site was rejected by the landscape architects (p. 279), as possessing "no evident natural fitness for either one of these purposes."

Not to go into matters of litigation over the sale of park lands east of Flatbush Ave., it may be briefly stated that the plan finally adopted included the sale of the "east side lands" lying north of Eastern Parkway, and the retention of those south of the Parkway between Washington and Flatbush Avenues. This, excepting the Mt. Prospect Reservoir area, was the original tract leased by the city to the Brooklyn Institute of Arts and Sciences in December, 1909, for botanic garden purposes.

From the above account it is seen that the idea of a botanic garden in Brooklyn has been a leaven in the lump for over fifty years. Fortunate indeed it was that the area now comprising the Botanic Garden was not sold by the city to be laid out in streets, utilized for the site of an armory, or for any other than

its present purpose. The northern end of the tract has afforded the most advantageous site within the whole city for the Brooklyn Museum, and the development of the Museum and the Botanic Garden in such close proximity is mutually advantageous.

A more detailed account of the steps leading to the establishment of the present Brooklyn Botanic Garden was given in the RECORD for October, 1913.

C. STUART GAGER.

FIFTH ANNUAL CHILDREN'S GARDEN EXHIBIT

Our Annual Garden Exhibit for boys and girls was held September 13th and 14th at the Botanic Garden. Mr. Henry Hicks, of Isaac Hicks and Son, Florists, Mr. Edward Mahoney, Director of the Fairview Children's Gardens, Yonkers, and Mr. Montague Free, of the Garden staff, were the judges.

The competition in some classes was very close. Our trophy for the best school garden display was won a second time by P.S. 98, but P.S. 89 was a very close second, and P.S. 162, a new exhibitor, was hot on the heels of No. 89. P.S. 162 started a war garden this year and made an unusual showing for a first year garden. Besides the crops which had been taken out for home use, and which were being canned in the school garden, $68.14 worth had been sold. The trophy for the best roof garden was tied between P.S. 43 and P.S. 36. P.S. 43 is a pioneer in this work. The best display of window boxes was made by P.S. 49. The individual medals in individual classes were won by members of different Brooklyn schools. The specimens sent in, in these classes, were better than ever before, showing that the boys and girls made better selections and had learned how to get products ready in first-class shape for exhibiting. We noted a marked change in this over the first two years. War Stamps were given for the best back yard gardens. This is not a new class, but the conditions in the contest differed from those of any other year. The problem was: How to get as much as possible out of a given back yard. Contestants in this class were obliged to hand in plans for the garden, pictures, charts, and records showing ex-

actly how much had been made from the garden, estimating the crops at market prices. Two first prizes were given in this class; one to Milton Gay, of Erasmus Hall High School; and another to Robert Barr, of P.S. 89. The first prize was $15.00 in War Stamps. The second prize, $10.00, or two War Stamps, was won by Karl Klostermaier of P.S. 89, while the third prize of one War Stamp was won by Russell Mungar of the same school. It is interesting and significant that so many of these prizes should be carried off by a school where garden teaching has been a part of the curriculum for the last three or four years.

The prizes were given out on September 28 at 2:30. At the same time, prizes were awarded to boys and girls in the Brooklyn Botanic Garden who have done exceptionally fine work. These latter prizes consist of bronze and silver medals, War Stamps, and Thrift Stamps, as explained in the Botanic Garden *Leaflet* for June 12, 1918. The school trophies and stamps were presented by Mr. Alfred T. White, through whose generosity the War stamp and Thrift stamp prizes were made possible. The medals and certificates of honorable mention were awarded by Dr. Gager. Miss Theodora Hay, chairman of the Garden Teachers Association of the Brooklyn Botanic Garden, presented the silver cup which is awarded annually by the Association to the boy or girl who has attended Botanic Garden classes for more than one year, who has done work of superior merit, and who has been adjudged most generally helpful in connection with the work. The award this year was to Miss Sylvia Anderson.

As one of the innumerable evidences of the genuine interest of the children in their work, it may be mentioned that one of the boys, Irving Greenfield, came once a week all summer from Far Rockaway, L. I., a round trip of about 30 miles, to care for his garden plot.

Ellen Eddy Shaw

NOTES

The first volume of the Brooklyn Botanic Garden *Memoirs*, was issued July 6, 1918. The book comprises the scientific papers

presented on April 20–21, 1917, on the occasion of the dedication of the laboratory building and plant houses. There are thirty-three contributions, covering 521 pages, 28 plates, and 41 text figures. Table of contents will be mailed on request. The price of the work is $3.50, plus postage.

Mr. John McCallum, a well known amateur botanist and zealous collector of plants of Long Island and vicinity, died March 17, aged 74 years. In 1915 the Garden acquired Mr. McCallum's herbarium of about 1,700 specimens, chiefly of the local flora.

The Sixth Annual Meeting of the Eugenics Research Association was held on June 21–22, 1918. The meetings of the first day were at the Eugenics Record Office, Cold Spring Harbor, Long Island, and those of the second day at the Brooklyn Botanic Garden, from 10:00 A. M. to 1:00 P. M.

Among summer callers at the Garden were Prof. E. N. Transeau, Ohio State University, Dr. W. A. Orton, pathologist in charge of cotton, truck, and forage crop disease investigations, Bureau of Plant Industry, and vice-chairman of the Federal Horticultural Board, Mr. Harry B. Shaw, pathological inspector at the Port of New York, Alexander Lurie, horticulturist of the Missouri Botanical Garden, Mrs. Theron A. Strong, New York City, and S. H. Burnham, Hudson Falls, N. Y.

Mr. Alfred T. White, of the Botanic Garden Governing Committee, and Dr. Gager and Mr. Taylor, of the Garden staff, were in Bretton Woods, N. H., on July 10–13, and made collections on the Alpine garden and other parts of Mt. Washington. During the following week Mr. Taylor made collections at Orient Point and Gardiner's Island.

On July 15, Mrs. August Dreyer, assistant director of the New York Federal Food Board, a branch of the United States Food Administration, gave an illustrated lecture in the Garden Lecture Hall on Food Conservation.

Coöperation with the Board of Health.—During July the Garden furnished to the Brooklyn Branch of the Department of Health mounted specimens of the poison ivy, and also of the Virginia creeper for comparison, to be used in the district offices of the department for purposes of identification. It is proposed by the Department to take measures to eliminate, as far as practicable, not only poison ivy, but also the Great Ragweed, the pollen of which is regarded as an important contributing factor in causing hay-fever. In connection with the latter the Garden has also supplied the Borough offices of the Health Department with herbarium specimens of the ragweed, both the form with incised leaves (*Ambrosia trifida*), and the entire-leaved form (*Ambrosia trifida* var. *integrifolia*). The Department was also supplied, for distribution, with a quantity of the Botanic Garden *Leaflets* of May 17, 1916, on treatment of poison ivy poisoning. In October mounted herbarium specimens of the Jimson Weed (*Datura Stramonium*) will be furnished for similar use. Cases of serious poisoning, especially of children, by eating portions of the Jimson Weed are not uncommon.

Harold Uhrbrock, who has worked at the Garden for the last three years and is now in his second year in high school, raised in our greenhouse this spring, independent of any instruction, although he had received the necessary knowledge in his past courses, 800 celery plants, 325 tomato seedlings, and 72 plants of New Zealand spinach. During the past summer this boy took charge of garden work in a boys' camp at Ticonderoga, N. Y. He packed and sent 125 tomato plants to the camp, gave 100 to the Botanic Garden, planted some in his home garden, and presented the remainder to a Long Island farmer. His celery and spinach plants were used in the same way. This is a little sidelight on the independent work that our older boys and girls do at the Botanic Garden.

On April 13, at the last meeting of the Boys' and Girls' Clubs of the Brooklyn Botanic Garden, two boys, Fred Kholand, Junior High School, P.S. 85, and Frank Henjes, P.S. 92, received their silver buttons from the Director of the Garden. The

work done for these buttons covered a period of one year. Common trees of Brooklyn was the subject of their study, covering a knowledge of the trees in bud, flower, fruit, and winter appearance. Twig mounts, leaf prints, and other concrete material was brought in to illustrate their talks. Each boy and girl receiving a silver button must give a talk on his subject before the club, and bring to it any illustrative material he has collected.

Dr. Frank N. Meyer, who discovered the home of the chestnut bark disease, was drowned in the Yang-tze river, China, on June 1, 1918. As an agricultural explorer for the U. S. Department of Agriculture, Dr. Meyer had travelled extensively for ten years in China, Siberia, Persia, Thibet, and Turkestan, and many new species and varieties of economic plants have been introduced into cultivation in the United States as a result of his explorations. He had walked and explored from Holland to Italy, and also across central Mexico. For eight years previous to coming to the United States (1900) he was gardener to Prof. Hugo deVries, in Amsterdam.

Dr. F. T. Sun, president of the School of Fisheries, Tientsin, China, Mr. Yan-Hsiu and Mr. Fan Yuan Lien, of the Chinese Bureau of Education, and Mr. Tse-chien Tai, librarian of the Tsing Hua college library, Pekin, visited the Garden on August 31 to inspect our educational and scientific work. Mr. Yen-Hsiu and Mr. Fan Yuan Lien are especially interested in elementary agricultural education, and were particularly interested in our children's gardens and related work.

Dr. Jean Broadhurst, Professor of Biology and Nature Study at Teachers College, visited the Botanic Garden August 2 with one of her summer school classes. The class consisted of 35 members who came for the purpose of seeing our garden, and for a discussion of the methods employed in our children's work. While the Curator of Elementary Instruction took this class, Dr. Broadhurst spoke to the students of our own summer school on "How high school botany affects every day living."

Mr. Kilpatrick, the Supervisor of Children's Garden work under the City Board of Education, and his teachers visited the

Botanic Garden on August 7th. The object of this visit was to see the children's gardens and to discuss the work which was being carried on by the city. Fifty teachers attended this conference. Refreshments were served by the Botanic Garden.

Children's Gardens.—This summer we have had 387 boys and girls in our garden. This is the largest number we have ever had registered in one summer. An interesting feature of this year's garden was the 10 by 20 ft. war gardens. These gardens were conducted by our older boys and girls who have been at this garden from two to four years, and by Erasmus Hall High School students. There were 22 members in the Erasmus unit, and 45 in our own unit. These larger gardens were all different, because each person planted his garden to suit the needs of his family. Their plans were submitted in early spring and, after having been passed upon, the boys and girls used them as their guides for planting. The figures below show what was taken out of three gardens one day this summer. These figures are chosen at random and do not represent either the largest or the smallest yield, but just about an average amount taken out. The prices affixed are those current in the local market on the given date: Garden of *E. B.*—Lettuce—13 heads, 65c., beets—20, 40c., kohlrabi—7, 5c., chard—4 qts., 40c., beans—1½ qts., 22c.—total $1.72. Garden of *M. T.*—lettuce—6 heads, 30c., beets—15, 16c., kohlrabi—3, 5c., chard—3 qts., 30c., beans—1½ qts. 22c.—total, $1.03. Garden of *M. G.*—lettuce—12 heads, 60c., beets—20, 40c., kohlrabi—3, 3c., chard—3 qts., 30c., beans—2 qts., 30c.—total, $1.73.

The Federal Horticultural Board of the U. S. Department of Agriculture has issued *Notice of Quarantine No. 34,* effective October 1, 1918, prohibiting the importation for any purpose of any variety of bamboo seed, plants, or cuttings thereof capable of propagation, including all genera and species of the tribe *Bambuseae* from all foreign countries and localities. The object of this quarantine is to prevent the introduction into the United States of dangerous plant diseases, including the bamboo smut (*Ustilago shiraiana*).

The banana plant in the economic house fruited this year, although in 1917 it missed fruiting, probably due to the reduction of temperature in the greenhouses. Two years and three years ago it bore fruit in the early winter, the 1916 bunch weighing 214 pounds. The present crop, harvested about the middle of August, weighed only 59 pounds, as a result of the very unfavorable winter conditions, caused by the coal shortage.

American and German Efficiency.—The searchlight of war has brought out many interesting facts, and one of these is that the vaunted German efficiency will not always stand the test of comparison with American efficiency. The Germans boasted of being the greatest farmers on earth. Investigation shows that in efficiency in agriculture, measured by the produce per acre, America being graded 100, Belgium leads the world, at 205; Great Britain comes second, at 164; and Germany third, at 155; America comes fourth.

But the better test is the man test, rather than the acre test, and here America leads the world by over 2 to 1. Again, grading America at 100 per farm worker, Great Britain produces 43 and Germany 41. The American farmer cultivates 27 acres, the German farmer but 7. With the aid of vast quantities of fertilizer the German produces more per acre, but he produces at a much greater cost per bushel and he produces much less than half as much per man. (*Bureau of Publicity Weekly Press Matter No. 37.*)

Mr. John Harrison Dick, editor of the "Florists' Exchange," died suddenly on March 25, after an operation for appendicitis. Mr. Dick came to this country in October, 1910, giving up the editorship of the English "Journal of Horticulture" to assume the duties of editor of the "Florists' Exchange." He was secretary of the American Dahlia Society, and a member of the executive committee of the American Sweet Pea Society. On June 21, Mrs. Dick presented to the Garden, from Mr. Dick's library, fifty-four books, and various botanical illustrations.

On Saturday, October 5, at 10 A. M. was held the third annual ice cream party of the children who have had plots during

the year in our children's gardens. About 300 children were in attendance. At eleven o'clock the boys and girls assembled in the lecture room, where three reels of motion pictures of plant life were shown. This is the first public exhibition of motion pictures at the Garden. The ice-cream is purchased each year with money voluntarily contributed by the children during the summer. The "unexpended balance" has been appropriated each year to purchase some gift for the Children's Garden. The first year a barberry hedge was purchased. Last year $25.00 was contributed for a flag for the Children's flag pole. This year the sum of $36.50 was presented to the director to be used for the support of a French orphan. This money was given for this purpose in memory of Benjamin Stuart Gager, a member of the 1917 garden.

Coöperation with the Federal Government.—Dr. Olive, of the Garden staff, spent his summer vacation in plant disease work for the Plant Disease Survey and Cereal Disease offices of the United States Department of Agriculture, and in coöperation with the Departments of Plant Pathology of the New York State Agricultural College, Cornell University, and the Virginia Polytechnic Institute. The work included a fruit tree disease survey of counties in the Hudson River Valley region; a study of onion smut conditions in the Wallkill Valley, of Orange County, N. Y.; an oat and barley smut survey trip through the Hudson River Valley counties; and a study of a new wheat disease in western Virginia. The latter disease, caused by nematodes in the grains, appears to present a serious menace to wheat-growing in certain districts in Virginia, and the U. S. Department of Agriculture and the Experiment Station at Blacksburg are much concerned over its spread. Methods of control include, besides rotation, the pouring of the grain into water and the skimming off of the black, lighter weight, diseased grains.

Receipt of German Periodicals.—The following German publications were received September 27, 1918, at the Brooklyn Botanic Garden Library through Martinus Nijhoff, The Hague. This was due to the efforts of the Committee on Importations, Amer-

ican Library Association, of which Dr. Frank P. Hill, director of the Brooklyn Public Library, is chairman, and Dr. M. L. Raney, Librarian of the Johns Hopkins University, is secretary. *Botanisches Centralblatt,* Bd. 38, Nos. 27–52, 1917; Bd. 39, Nos. 1–9, 1918. Early in 1916 the "Botanisches Centralblatt" ceased coming. *Flora,* Bd. 110, Heft 1, 1917. The last issue received was Bd. 108, Heft 4, 1915. *Zeitschrift für Botanik,* Bd. 10, Heft 1–3, 1918. Vol. 5, Heft 12, 1913, was the last number received. *Zeitschrift für Pflanzenkrankheiten,* Bd. 28, Heft 1–2, 1918. No issue has been received since v. 25, no. 7, 1915.

According to Mr. Nijhoff, *Mycologisches Zentralblatt* has ceased publication, and the following show irregularities of issue: *Archiv f. entwicklungsmechanik der organismen;* Vol. 43, pts. 1–3, issued in 1917; pt. 4 in 1918: *Internationale zeitschrift f. physikalisch-chemische biologie,* Vol. 3, pt. 1 was issued in 1916; pt. 2 in 1917: *Zeitschrift für gährungsphysiologie,* current vol. 6 started June, 1917: *Zentralblatt für biochemie,* current volume 19 started May, 1917.

A note in the March, 1918, number of the *Botanical Journal,* the official publication of the Royal Botanic Society of London, states that the Council of the society has found it necessary to suspend the publication temporarily, on account of the cost of printing and paper, and other difficulties incident to the war. Publication will not be renewed until conditions become normal.

We learn from *Science* that an institute of agricultural botany is to be established at the University of Cambridge. The new institution will be organized along the lines of the noted plant breeding station at Svälof, Sweden, and its activities will be along the lines of pure and applied science, with special attention to the commercial aspects of plant breeding. The scientific branch, according to *Science,* will be concerned with the production of pure cultures of new varieties on the field-plot scale; and the economic branch will deal with the growing and distribution of these varieties on a large scale. Subscriptions toward the establishment of the new institute amount to upwards of £30,000. The Board of Agriculture will provide the necessary buildings and equipment.

Mr. H. A. Caparn, consulting landscape architect of the Garden staff, was in Alabama during August and the first part of September, in connection with the town planning of three "nitrate towns," Florence, Sheffield, and Tuscumbia. "In Florence and Sheffield are located the two great plants for making nitrogen from the atmosphere by the cyanamid process. This particular location has been chosen mainly because, by the construction of an enormous dam across the Tennessee River, it is possible to create water-power greater than any in the States except that of Niagara. The work on the dam itself has been suspended until the close of the war because of the great need for men in other vocations, but will be resumed after the war, and meantime the plants get their power from the Alabama Power Co. for making the nitrogen so much needed for explosives and fertilizers. The undertaking has brought an increase of population much greater than the three towns can shelter, and the Housing Bureau is doing its best with the appropriation available to provide the best planned and constructed small towns for the workers possible under the circumstances. On each of these 'Projects' there are three designers, an architect, a town planner, and an engineer." Mr. Caparn has been appointed to the second of these positions.

Dr. Orland E. White, curator of plant breeding on the Garden staff, has been granted a leave of absence of three or four months, beginning August 1, 1918, for the purpose of coöperating with the National Research Council in the study of various problems connected with the growth and utilization of the castor oil bean. Dr. White has already visited castor bean plantations in Tennessee, Arkansas, Georgia, Florida, and Texas. The castor bean industry has become one of considerable importance, owing to the effort of the Government to have them produced in large volume primarily for the purpose of securing oil from the castor bean for use as a lubricant for air-planes. According to the official "U. S. Bulletin" it is proposed to use the stems and hulls of the plants as an ingredient for fertilizers, and Director General McAdoo has announced that publication has been authorized of new rates on castor bean hulls and stems in both carload and less than carload quantities the same as the rates on fertilizers

or fertilizer materials. According to the *Official U. S. Bulletin* for October 22, 1918, the acting director of the Bureau of Aircraft Production has established a price for the seeds of $4.50 a bushel of 46 pounds.

Recent gifts to the library include fifty-six separata presented by Dr. Elmer D. Merrill of the Bureau of Sciences, Manila, P. I.; and eight separata presented by the Botanical Department of Purdue University.

Three New National Forests Proclaimed in the East.—The Forest Service, Department of Agriculture, issues the following:

President Wilson has issued a proclamation establishing three new national forests in the East—the White Mountain, in Maine and New Hampshire, the Shenandoah, in Virginia and West Virginia, and the Natural Bridge, in Virginia.

The White Mountain National Forest is located in Grafton, Carroll, and Coos Counties, N. H., and Oxford County, Me. The Government has actually taken title to about 267,000 acres, and in addition about 124,000 acres more have been approved for purchase, making a total of about 391,000 acres under Federal protection. This forest protects in part the watersheds of the Androscoggin, Saco, Connecticut, and Ammonoosuc Rivers.

The Shenandoah National Forest is situated in Rockingham, Augusta, Bath, and Highland Counties, Va., and Pendleton County, W. Va. The Government has acquired to date slightly in excess of 100,000 acres, and an additional area of approximately 65,000 acres has been approved for purchase, making a total of approximately 165,000 acres under Federal protection. The forest is for the most part on the watershed of the Shenandoah River and it also protects a portion of the watersheds of the Potomac and the James.

The Natural Bridge National Forest is situated in Rockingham, Nelson, Amherst, Botetourt, and Bedford Counties, Va. The Federal Government has actually acquired title to a little over 73,000 acres, and an additional area of approximately 29,000 acres has been approved for purchase. The forest, which protects a portion of the watershed of the James River, does not in-

clude the Natural Bridge, but this scenic feature is within three or four miles of the boundary.

The National Forest Reservation Commission has just approved for purchase 54,672 acres of land for national forests in the White Mountains, Southern Appalachians, and Arkansas. All of these lands solidify the Government holdings and carry out the present policy of the commission to consider no lands which do not tend to block in with others previously approved for purchase.

The largest tract is one of 31,667 acres in Polk County, Tenn. It fills out the entire southern end of what is known as the Cherokee Purchase Area. The price approved was $6 an acre.

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